In This Issue—*Keeping Your Wares in Sight*

MOTOR AGE

Vol. XL
Number 1

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CHICAGO, JULY 7, 1921

Thirty-five Cents a Copy
Three Dollars a Year

Entered as second class matter Sept. 19, 1899, at the post office at Chicago, Ill., under Act of March 3, 1879.

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MOTOR AGE

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MOTOR AGE

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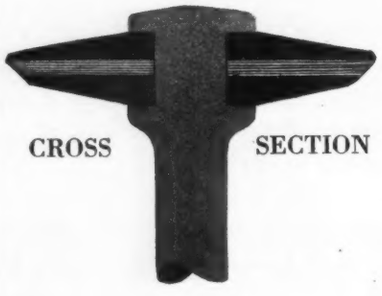

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MOTOR AGE

KEEPING YOUR WARES in SIGHT

by TOM WILDER

Clever Display Means Sales

THERE is an art in showing goods, in keeping the things everlastingly before the customer, not in an offensive way such as that used in the Jew hockshops where, if you hesitate or glance at his window the old man grabs you by the sleeve and forces you to look at his stock; but more as is practised in a metropolitan hotel diningroom, by the girl who sells French pastry.

She breezes past you several times during the meal, shyly and hesitantly giving your party plenty of time to look over her stock, and it's dollars to doughnuts some or all of you will want French pastry for dessert.

A cafeteria will always sell you 50 or 75 cents' worth of lunch when you only intended buying a sandwich, just because the food is well displayed, placed before you in seemingly endless variety, past all of which you must pass before you can reach the tables.

ONCE there was an old storekeeper who, when asked for a certain article very popular at the time, replied: "No, I hain't got none; tain't no use tryin' t'keep that stuff, folks buys it s' fast. I ain't had none since way last week. Don't think I'll get any more either, it's too much trouble tellin' people I hain't got none after it's gone."

This is about the way many garage men sell accessories. They take delight in having them on hand and are easy marks for salesmen, but they don't like to make the effort or exert the ingenuity necessary to sell them. They are more like misers that keep things for the love of possession.

Recently the writer had occasion to buy a brass coupling for copper tubing; he had never seen anything of the

Eighty-seven per cent of the impressions we receive are through the eye.

sort displayed in any of the local garages and there being a first class hardware store in town, thought he would try that. The hardware man must have been spying around for he gave him a tip to try L's Garage.

At the garage, after some effort, it was learned that the couplings were kept, but Bill had one key to the accessory room and Bill was out on a job. Shorty, the night man, had the other and he was asleep. Just as the writer was about to give up and send a mail order to Montgomery Ward, Bill blew in unexpectedly, and Bill's key revealed a fine stock all put up in a neat case just as the manufacturer had sent it out. Very few articles were missing, showing they had been well kept.

When found, this accessory and parts stock proved to be quite complete, but it is doubtful if one in ten of the customers of the garage in question knew about it. It is also doubtful if the sales amount to much more than enough to pay interest on the investment.

PSYCHOLOGY IN ALL DISPLAY

There is a lot of psychology in a window or showcase display. Men, as a rule, do not buy things just because they see them or because they are cheap, but because they want them. They may pass a display every day in the year and never want an article in it, but when the need comes they ask themselves, "Where did I see that socket wrench?" It is a pretty safe gamble that the garage or

Wherever people have to pass through a hall or have to wait is a good place for a showcase. This one is between the service manager's office and the waiting room and on the way to the parts department

Who could resist looking over a layout like this if he were forced by some circumstance to wait here a few minutes?

accessory store located in this man's universe, which had the most striking display of tools including socket wrenches, will get the sale. It is a foregone conclusion that the man who had his wrenches locked up in a closet, will not. The striking display will stand out in the man's memory longest, other things being equal, and in a short time all others will have faded into the forgotten past.

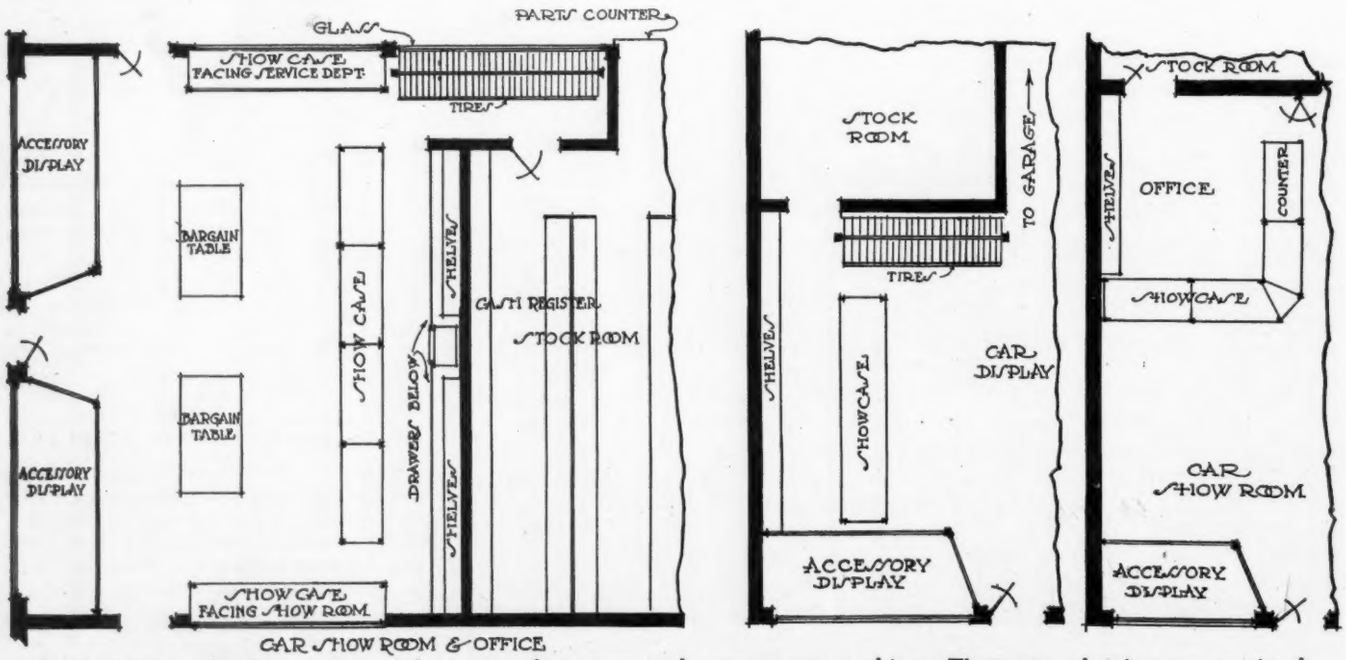
The psychology of showing goods goes further than making the display stick in the man's memory. It includes bringing the customer in contact with the display, or placing it where the customer must come in close contact with it—which is about the same thing. It includes displaying articles prominently which are seasonable, and eliminating those which are out of season. It includes every trick which can be devised to draw attention to or create desire for the goods one has to sell.

Take the man buying a new car. He is probably spending a little more than he can afford for the car and is not particularly interested in accessories, except in a passive sort of way. If the whole car showroom were surrounded with accessories the displays would not tempt him to buy anything.

Later, after he has been driving and learns the shortcomings and extra needs of the car, he becomes more susceptible to the wiles of the display. At this stage he occasionally visits the service station, either to get advice or have adjustments made, and it is here and in the storage department, rather than the car salesroom that accessories can be shown to advantage.

GIVE ACCESSORY STORE STRATEGIC POSITION

Where space permits, an accessory store at one side of the service station is a good proposition. Here invariably, waiting has to be done, and it is profitable to the garage man to have customers spend this time looking over the accessory display, planting the seeds of future desire, if all present needs are satisfied. There is another thought, too;



At the left is a plan for a very complete store where space and expense are no object. The center plan is more restricted, while the right hand one shows a good way of handling the problem in a small general garage

if the customer is busy looking over interesting things he will not be fuming about having to wait.

Sometimes the accessory store can be made the connecting link between the garage or service station and the car showroom, and this is an ideal arrangement.

When space or other uncontrollable factors will not permit the accessory store to be adjacent to the service station, it is sometimes possible to place wall cases at strategic points to arouse the interest of customers.

Sometimes the waiting room may be combined with the accessory store—a plan which is always good.

On the west coast where winters are mild and everything is open the year round, the whole entrance is made into an accessory store. The showcases, tire racks, and counters are placed directly along the aisle so that the customer cannot get in or out without passing the displays; here he can make a purchase without getting out of his car. There is no good reason why some ingenious person should not arrange some way of doing this in the east, if only during the summer months when trade is heaviest.

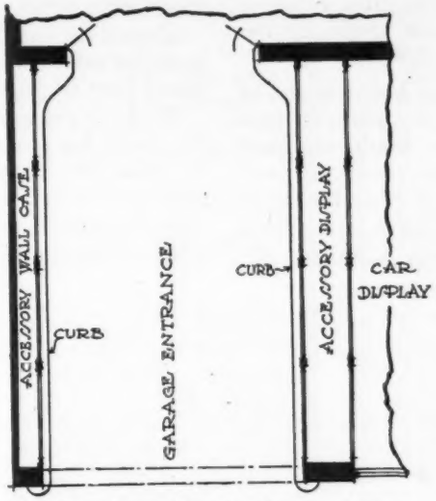
SIZE OF ESTABLISHMENT DETERMINES LOCATION

Of course, wherever possible, it is best to have the outside show window in front of the accessory store so that should a stranger see something he desired in the window, he would not have to go hunting or inquiring through the building to find the store.

Much better arrangements can be made in large establishments than in small, although, on the contrary, much worse arrangements may result from poor planning. The whole problem turns on the care given the original layout.

In the small building, departmentalization has to be dispensed with to a great extent. The accessory showcase often forms the railing of the office and the stenographer or the bookkeeper is the accessory salesman when the proprietor is out. Here it would be impossible for the customer to go astray, and while the arrangement is perhaps not the best, it is quite good. There is really no other place for the store, as with another location it would require more help to operate, and the small organization cannot support a special clerk for every duty. Then too, customers in a small establishment naturally go to the office for everything. There is more of a personal atmosphere about such places. The proprietor is found in the office and everyone likes to do business with the "boss."

On the west coast, where everything is open winter and summer, and in the south, accessories are shown along the driveways where everyone must pass



Utilize the walls of a long entrance passage to display accessories. Treated in this way the space is not a waste—it will even pay dividends

In large place things are different. There is a well organized accessory store, and here, its location spells success or failure. In such institutions the goings and comings of the customers must be watched, and if they do not follow the lines laid out for them when the building was planned, the building must be changed. The customer will not change his line of march without a fight.

STUDY CUSTOMERS' ROUTES

Take into consideration where your customers come from, where they go when they leave. If there is a way for them to make a short cut, they will take it. If they take the short cut and avoid passing your showcases, that is your loss. If there is a place where they have to wait with nothing special to do, that is the location for a display of good salable merchandise.

It is of the greatest importance in laying out the departments of a new place to consider the course customers will take. It will not do to say, "Here is a place where you can have the accessory department because it will not be in the way of cars in the showroom," or "because Mr. Jones needs that other space for his private office so that he can see the people that go by."

It is necessary to route the customers through the building, making it handy for them to get through and do business, but at the same time, it is advisable to lead them over all the pitfalls and past all the sirens possible, in the form of accessory displays. Use the tactics of the cafeteries; make them pass the display going in and coming out and as many additional times as possible.

The parts service department, another example of a strategic location; the regret here is that they did not fill the whole space

Used Cars, Like "Old Man of the Sea," Carry Dealer into Deep Water

Responsibility of Present Chaotic Condition About Evenly Divided Between Manufacturer and Dealer

By W. O. Protsman
Leyman Motor Car Co., Louisville, Ky.

THE used car branch of our business must cease to show losses and must begin to show profits or the business will cease to exist.

In the beginning the used car end of our business was of small moment. The number of trades we made in proportion to the number of clean deals we made was very small. We were all willing to make two deals for one profit. This way of doing business placed a burden upon the new car department which is still there and which rides the whole business like "the old man of the sea" into deep waters where the waves roll high.

It must inevitably submerge and destroy the automobile business unless we execute at no distant day a complete about face in our way of doing things.

We have retrograded from the original plan of making two deals for one profit to the humiliating point of making two, three and even four with no profit—and sometimes an actual loss.

No business in the world can continue to operate under similar conditions.

THERE is no conceivable reason why the used car you sell should not carry the same margin of gross profit that your new cars carry.

If your discount in your new car is 18 per cent, then whatever used cars you sell after they have been reconditioned and made completely ready for sale should earn for you the same ratio of profit.

USED CAR LIABILITIES

A used car takes up just as much room as a new one, costs its full proportion for insurance and investment, costs more to advertise and a great deal more to keep in condition. Consequently, if we sell it for what we allowed and make no provisions for absorbing these items of expense, we suffer a loss just as definite as though someone had taken an equal amount from our cash drawer—which, in fact, they have, though even in a deadlier, because a more insidious form. This is to say nothing of our profit and profit is what we need and must have just as we need and must have the breath of life.

You can create nothing out of costs—if you sell at the price at which you buy, you have merely set up a deadly, never-ceasing tread mill, which will, in the end, defeat you as certainly as you live to continue it.

Can you imagine a banker handling your first transaction at a profit and subsequent loans at cost or at a loss? Can you imagine a real estate man foregoing his commission on a house because he had at some previous time sold you another? Can you imagine an insurance company writing a second policy on your life at a lower rate because of the first one

If our business is to endure we must progress to the point where each dollar of our sales shall contemplate its just share of expense and its full ratio of profit.

When a used car comes into our place, it is just as much a purchase of stock as is the new one. It should have just the same treatment. There is nothing intricate about this used car situation. We are all agreed:

That something is wrong.
That the problem can be solved.
That the problem must be solved.
So—"why stand we idle?"

In order to get at anything like the solution of the present condition as it affects used cars, it is necessary to begin at the beginning, to find out the causes, to suggest something of an ideal condition, and then to address ourselves to the best solution we can get.

It is our job, just the same as it is the job of the real estate men to sell houses which have been lived in for years, as well as houses in their new development projects.

MANUFACTURER AND DEALER BOTH RESPONSIBLE

If we go at once to the root of the trouble, we find that the responsibility for the present chaotic situation is about equally divided between manufacturers and dealers. Too many manufacturers have listed their product at a price greater than they expected to receive in cash for it, in fact, greater than they themselves believed it to be worth, and then have encouraged their dealers to make trades on the basis of longer allowances than could possibly be obtained for these used cars on the open market.

This practice has exerted a corrupting influence in two ways; first, because it was wrong in principle, and second, because it educated the dealers selling these makes of cars into the wrong methods of doing business. What we need is a greater conservatism, both among manufacturers and dealers.

The dealer has contributed his share to the general condition by his desire to do business; to put his new cars on the street regardless of the question of profit. He has been willing too often to trust to luck to bring him out on the right side of his deal. As far as we have been able to observe, luck has no place in the used car business.

It is unquestionably true that if we take the collective experiences for the last twelve months of dealers doing business in the city of Louisville, that a fair estimate of their losses, through their dealings in used cars, has been not less than a quarter of a million dollars. I mean by this that they have lost this much money out of their business, that their volume of profits and the money which they should have in the bank is a quarter of a milliion dollars less than it ought to be. And the situation grows worse instead of better.

The condition as it exists in Louisville is a counterpart of the condition in practically every city in the United States. Some dealers have tried in one way or another various cooperative plans. Some of them have incorporated a company for taking over the used cars belonging to the different dealers. Others have tried a cooperative appraisal plan, but in no case, according to these reports, is there any tangible plan now in successful operation.

The problem must be solved by the dealers themselves.

A number of plans have been worked out. I believe the best plan would involve a central appraisal bureau. In other words, maintaining an office and employing therein a man, or men if necessary, whose sole duty should be to appraise all of the cars offered in trade to the various dealers. The good feature of this plan would be that if thirty dealers were a party to it, thirty establishments open, and thirty forces organized to sell used cars, with their future dependent to a large degree on their ability to move at a profit their stock of used cars, it is my belief that a greater number of them would be sold than if it was left to one central organization, no matter how well organized.

I think each concern should carry its own investment in whatever used car it trades in. I do not want to put any money in anybody else's used cars and I do not want anybody to have any money in our used cars.

If we could refer each man who came with a car to trade to a central office, where competent men would give him an appraisal slip, good in any dealer's place of business, provided that dealer wanted the business on that basis, then I believe we should have taken a long step forward.

PRECLUDE OVER-VALUING USED CARS

We are justified in organizing a plan that shall preclude the buying of used cars at prices far beyond their value. Not only the profits of our business are in jeopardy but the life blood of the business itself. The owners are being damaged by this state of affairs as much as anybody else though they have not yet realized it; so the situation is up to us to handle.

I have been fully impressed by the ability of some of our owners as salesmen and I am constrained to think the best automobile salesmen in Louisville are outside the business. I know I have remarked to a number of them if they ever get out of a job and come up to our place, I will see that they are put to work, because if they can sell cars to the public with the same good grace and the same high prices that they have attempted to sell to us, they they ought to make "crackerjack" salesmen.

If the solution of this problem, as we now see it, depended upon the will of any widely scattered body of men, I should feel inclined to give the task up as helpless, but inasmuch as it is, as far as Louisville and many other cities are concerned, within the control of the executive heads of about thirty-five business houses, then we have at least the possibility, if not the probability of a solution. Of course, it can all be covered in one sentence. "Do not pay more for a used car than it is worth"—but getting all the men concerned into that frame of mind is another question.

The central appraisal bureau could be conducted at an expenditure not exceeding $25 a month for each of the dealers represented, and probably less, and I believe the plan is more feasible and has in it more potential elements of success than has any other.

Equipping to Handle Over 1000 Calls Per Month

To Render Quick Road Aid, the Chicago Motor Club Service Side-Cars Carry the Tools Listed Here

IN a recent issue we showed an illustration of one of the motorcycle dispatch cars used by the Chicago Motor Club in its mechanical first aid department, and since then have had inquiries as to just what tools and equipment these cars carry. Herewith is listed this information.

Incidently the service work rendered by the club during the month of May is interesting.

In all, the records show that 2,054 calls for aid were received by the dispatcher of the department. This is slightly below the average for the ten months the department has been in operation and this, no doubt, was caused by the variable weather of the month. Of the total of 2,054 calls, 1,053 were taken care of by the motorcycles, while in an additional 265, motorcycles were sent to the member calling only to find that the trouble was of such a nature as to require the assistance of a tow truck. In the grand total of 1,318 runs, the cycles covered 11,597 miles, an average of 8.79 miles per call.

Of the 2,054 calls, no fewer than 903, or almost half, were for ignition trouble. This is by far the highest single cause of trouble in the list and would seem to bear out the contention of service men that the average automobile owner is lacking in knowledge regarding ignition. That the majority of this trouble was simple to remedy by one who understood ignition is shown by the fact that the mechanics had most of the cars making such calls in working order within a very few minutes after reaching them.

How the Chicago Motor Club service side-cars carry the necessary tools for aiding stranded motorists

RECORD SHOWING CAUSES FOR SERVICE CALLS DURING MAY

Ignition trouble	903
Battery trouble	126
Wrecked	521
Carbureter trouble	118
Gas line clogged	46
Out of gas	35
Out of oil	3
Engine trouble	34
Overheated engine	7
Tire trouble	134
Starter	81
Oil pump	4
Brakes	19
Mired	10
Miscellaneous	13

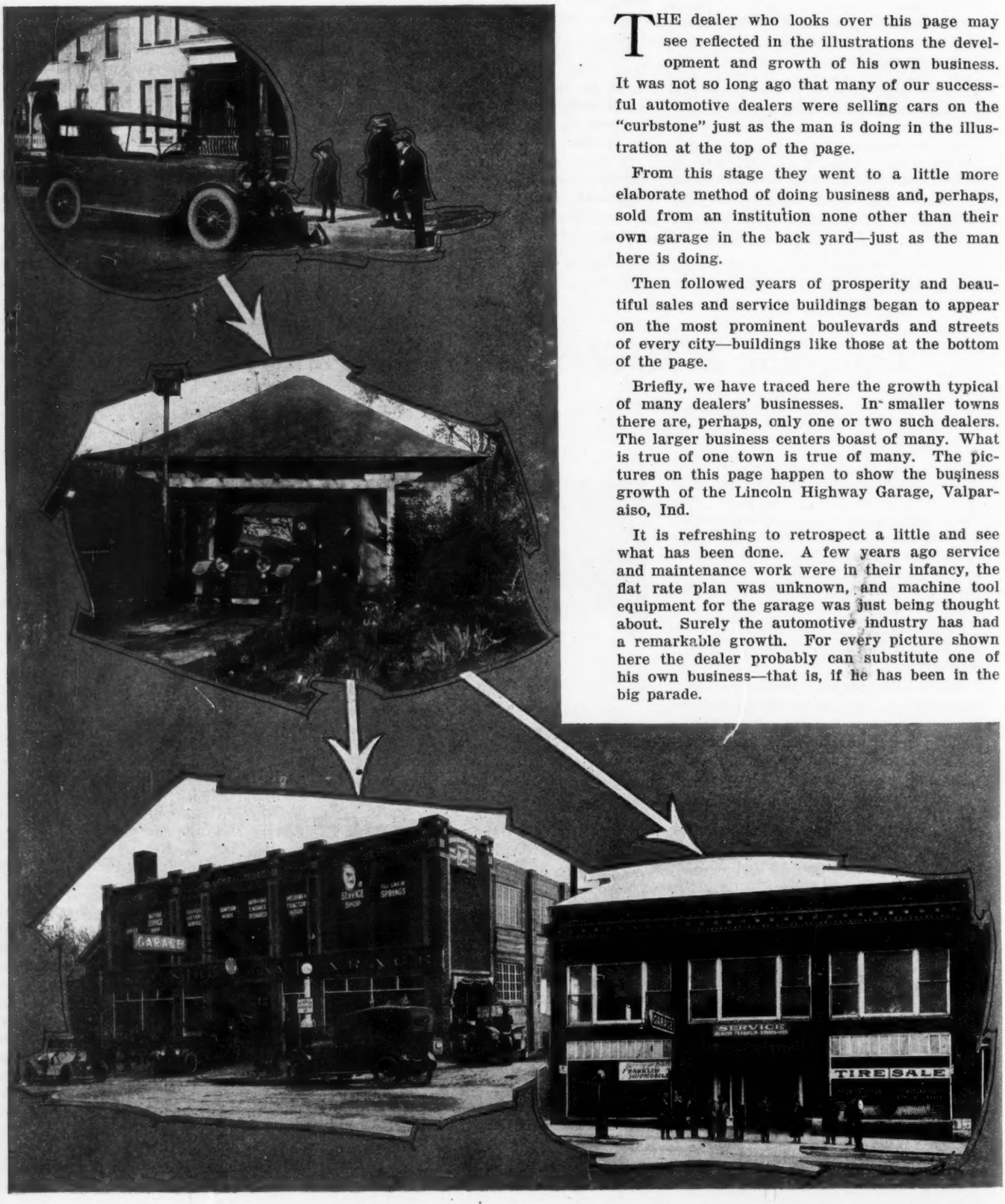
The equipment boxes of the dispatch cars carry the following:

One three-gallon gasoline can; tire pump; gallon oil; 170 Am. battery; two 6-foot battery leads; small jack; Simplex 41 jack; pull-out set; one each 722, 723, 725, 727 and 729 double end wrenches; 4-pound sledge; 1-pound hammer; ½-pound hammer; two small tire tools; 6-in. file; Ford wheel wrench; 10-in. wood handle monkey wrench; 8-in. screwdriver; 4-in-1 screwdriver; oil can; 6-in. funnel; vacuum tank funnel; pair 6-in. pliers; pair electrical long nose pliers, side cutters; roll of tape; Pyrene gun; magneto wrench set; point file; 24-inch Stillson wrench; one each 731, 733, 737 and 738 wrenches; pair side cutting pliers; pair 10-in. adjustable pliers; side cutting pliers; pair 10-in. adjustable pliers; 8-in. Crescent wrench; 8-in. flat file; 4-in. screwdriver, and 1-quart can of kerosene. Besides this, the car also carries a map showing the location of all mechanical service stations, as well as a limited supply of route and touring information.

It may be of interest to those operating a wrecking or service truck to know the variety of equipment carried by the motor club dispatch cars. It might be mentioned that these cars are so fitted that practically any sort of trouble, outside, of course, of a wrecked car, can be given attention. For example, the job of filling a vacuum tank which has been sucked dry is a difficult one unless there is available a small funnel. A magneto or distributer point file is a small item, but a mighty handy one when needed on the road to dress up a set of points for a stranded motorist.

From "Little Acorns"—Big Business

Stepping From Curbstone to Modern Sales and Service Buildings History of Many Dealers



THE dealer who looks over this page may see reflected in the illustrations the development and growth of his own business. It was not so long ago that many of our successful automotive dealers were selling cars on the "curbstone" just as the man is doing in the illustration at the top of the page.

From this stage they went to a little more elaborate method of doing business and, perhaps, sold from an institution none other than their own garage in the back yard—just as the man here is doing.

Then followed years of prosperity and beautiful sales and service buildings began to appear on the most prominent boulevards and streets of every city—buildings like those at the bottom of the page.

Briefly, we have traced here the growth typical of many dealers' businesses. In smaller towns there are, perhaps, only one or two such dealers. The larger business centers boast of many. What is true of one town is true of many. The pictures on this page happen to show the business growth of the Lincoln Highway Garage, Valparaiso, Ind.

It is refreshing to retrospect a little and see what has been done. A few years ago service and maintenance work were in their infancy, the flat rate plan was unknown, and machine tool equipment for the garage was just being thought about. Surely the automotive industry has had a remarkable growth. For every picture shown here the dealer probably can substitute one of his own business—that is, if he has been in the big parade.

Small Engines to Feature Paris Show

Coming Drop in Size Due to Changing Economic Conditions and Public's Desire for Cars Less Costly to Maintain

By W. F. Bradley
(European Correspondent, Motor Age)

THOSE who have followed the trend of racing car design over the past few years will recall that the engine size has been reduced from over 500 cu. in. piston displacement to 183 cu. in., and with the reduction in size has come not only greater speed, but greater all-around performance. All of these facts have a more or less direct bearing on the design and development of motor cars used for other than racing purposes.

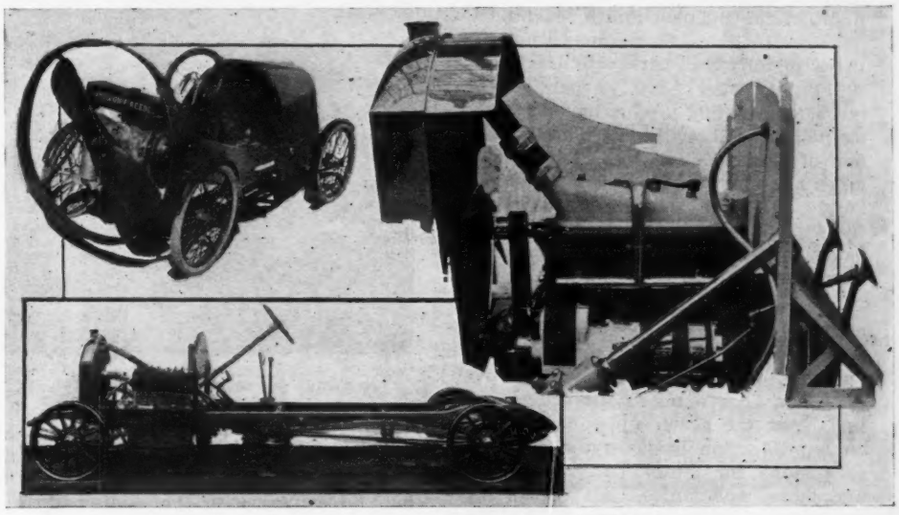
We have learned long ago that it is not necessary to use a battleship to cross the Hudson River. Neither is it necessary to have 60 or 100 hp. under the hood of our cars today to cross the state of Iowa, or the city of New York. With more and more miles of good roads being built throughout the country the need for large cars and engines becomes correspondingly smaller. We shall, of course, always have a certain number of makers building large cars, but it is just as likely that these makers might in addition to the large car build a small one. This is quite characteristic of many of the European makers. Some American makers are giving the light car attention now. Elsewhere in this issue appears, for example, the description of the Driggs car, a newcomer in the American market and distinctly a light car.

The average piston displacement on the automobiles to be presented to the public at the next Paris automobile show on October 5, will mark a considerable drop. At the present time the average piston displacement of French automobiles is in the neighborhood of 183 cu. in., if considered on the basis of the number of types produced. If actual production figures are considered, however, the average piston displacement drops to about 130 inches, for the cars built in the greatest quantities are those with small engines.

The coming drop in size is due to the decision of several important firms who have hitherto built only big and medium-sized car, to put smaller models on the market. This move has been rendered necessary by the changing economic conditions and the desire of the public to possess cars which will be less costly to maintain.

It does not imply a reduction in quality, but the building of cars which will be economical to operate because of their low gasoline consumption, smaller tire costs, and reduced taxation.

There is a feeling even among users who have the means to operate a big car that it is economical to maintain two machines, the big one being used for long distance travel when a full load is carried, and the small car getting general and about-town service. The economies in gasoline and tires more than compensate for the Government taxes on two cars.



Upper left, the Reese Aero-Car, a 60-in. wheelbase light car being developed in this country by the Sheldon F. Reese Co., Inc., Huron, S. D. Below is the Darracq four cylinder light car and to the right, the 10 hp. engine of the Puegeot

MANY ENTER SMALL CAR FIELD

Among those who are stepping into the small car field is Delage with a four cylinder 10 hp. model fitted with front wheel brakes. When he entered the automobile business, Delage specialized on a car of this size, but during the war he transferred to a big six-cylinder luxury type.

This model is being continued, but the concern will also make the 10 h. p. four cylinder type of 2.7 in. bore. Delage has no intention of invading the cheap, big production field, but is presenting his smaller type for those clients who feel that it is not economical to use a 40 hp. six cylinder model for town service and short distance trips.

Darracq, whose two present models are an eight cylinder of 2.9 in. bore and a four cylinder of 3.3 in. bore, will probably drop this latter next year when they put on the market a new 10 h. p. four cylinder type. The line will thus consist of a powerful luxury type car and an economical 10 h. p. four passenger automobile. A similar change is contemplated by Lancia, one of the most reputable makers on the Italian market, who will maintain his present big four and supplement it with a popular high grade four.

Sunbeam, in England, has a 10 h. p. four cylinder car under construction, and the Austin factory is also preparing an automobile of the same size and power. Panhard, whose smallest model at present has a four cylinder engine of 2.8 in. bore is contemplating the production of a still smaller type. The three biggest producers on the continent of Europe, Fiat, Renault and Citroen, will not make any important change, for these firms already build cars with the smallest engine possible on a full size four passenger automobile, the piston bores being 2.5 ins. for Fiat, 2.9 ins. for Renault, and 2.5 ins. for Citroen.

With the exception of Voisin, who has a big 12-cylinder high grade car under test, there are no indications that new luxury models will be presented at the Paris show. Even if the 12-cylinder Voisin is offered for sale, it will not interfere with the output of the present four cylinder sleeve valve engine of 3.7 in. bore.

Two or three of the leading French makers are experimenting with cycle cars with a view towards early marketing.

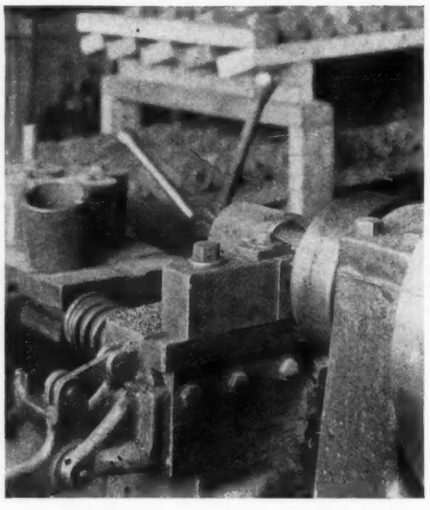
What the Service Man Should Know About Pistons

Trip Through Plant of Piston Manufacturer Reveals Many Things of Interest to Those Engaged in Maintenance Work

THE manufacture of service parts during recent years has grown to be a tremendous business. For example, the piston business alone affords a very interesting study. The following information is taken from the plant of the Spencer-Smith Machine Co., of Howell, Mich. This concern manufactures pistons exclusively to the number of slightly over 2,000,000 per year. A large part of this production is for service pistons, although a considerable number of factories making their own engines are also supplied. The factory has 30,000 sq. ft. of floor space devoted to their business and their service piston stock represents 147 different models of cars and trucks.

In order to supply the specific demands for oversize pistons a semi-finished stock of 50,000 pistons is carried on hand, out of which the various oversizes can be ground as the orders come in. Even the service pistons are made on a production basis in the same way as pistons for motor car, motor truck and motor companies. All of the service pistons are run through the main production line; that is, from opening to the final grinding operation, in 3,000 lots.

The pistons are then placed in stock and ground to meet the various requirements of the trade. All of the service pistons are held to the same limits and get the same inspection treatment as the pistons which are produced for the motor car companies. For example, the piston



Opening operation on a Bardon & Oliver special opening machine

pin hole is reamed to size with a tolerance of plus or minus .001 in., and it is held to square with the gliding surface of the piston with a tolerance of .001 in.

PERFORMANCE RECORD DETERMINES PRODUCTION

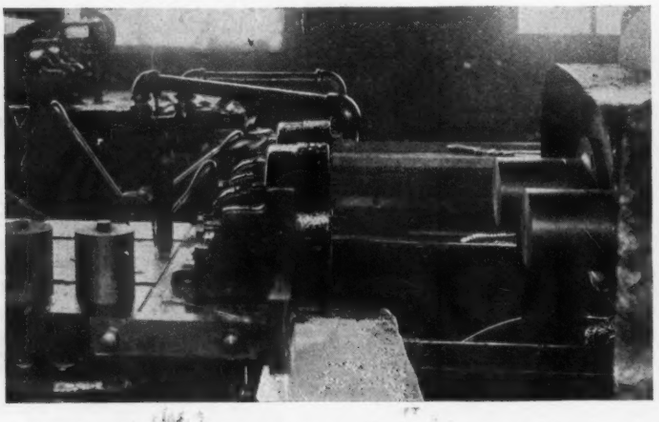
The grinding limits are plus or minus .0005 in. All of the pistons are inspected on amplified gages registering down to .0001 in.

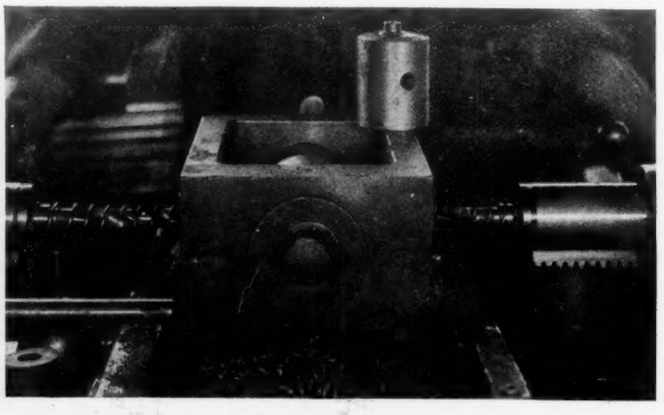
Insofar as the service pistons are concerned, the output of the plant is sold through the leading jobbers throughout the country who are now stocking pistons to handle the garage and dealer trade in their respective territories. In bringing out a new service piston, the usual policy of this concern is to send out letters to the various distributors asking their opinion on the performance on any given type of piston. If it is found that a piston has defects, the unit is redesigned before production is started.

Care is also taken in designing to make the piston as light as possible without sacrificing any of the essential requirements. For instance, it is claimed that the Buick piston is 7 oz. lighter than the factory piston. The piston for the Chevrolet 490 is 10 oz. lighter than the standard 490 piston.

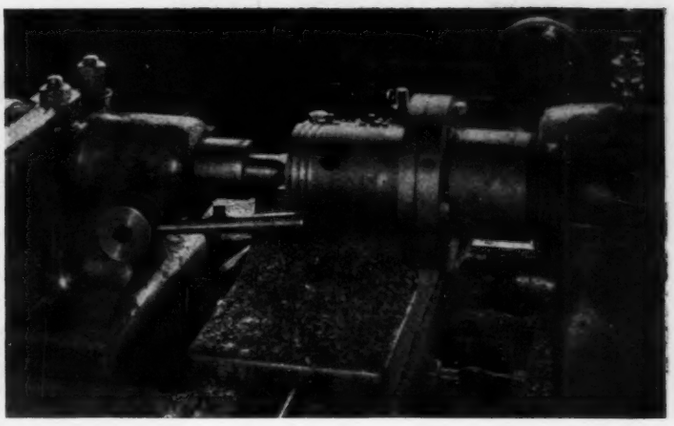
Semi-steel castings are used throughout, as it is the opinion of the Spencer-Smith company that semi-steel is the most suitable material for piston manufacture. The reason given is that it is tougher than the ordinary gray iron, and while it does not machine as readily, it possesses additional stamina to withstand the shocks to which pistons are subjected. The company also states that semi-steel pistons can also be held to much closer machining dimensions than is possible with cast iron, and also, with these it is possible to obtain a minimum weight.

The operations shown herewith follow the SS-3 Olds, Oakland and Scripps-





Rough turning and rough facing the piston head on a Jones &Lamson double spindle machine. Right, cross-boring the piston on a Garvin machine



Finish turning the piston. One operator can finish turn 160 pistons per hour. Right, rough and finish ring grooving the piston. The ring grooves are rough turned and finished in one operation

Booth pistons through the production line. This is a light weight, semi-steel replacement piston for the aluminum pistons used in the Olds, Oakland and Scripps-Booth cars. The weight of the piston is 14 oz., and during the last 12 months, the Spencer-Smith company has sold 80,000 of this one particular piston.

The pistons are first annealed in a Ferguson furnace using crude oil for fuel. It is a continuous operation furnace, the pistons rolling down on an inclined plane, as indicated in the illustration. The furnace holds 600 pistons on an average at a time and these are fed in by gravity, as desired. The pistons are subjected to a heat of 1350 deg. Fahr., in this furnace for 1¾ hours, after which they are allowed to cool slowly. Care is used in the cooling operation that the piston does not become chilled. This is done by allowing the piston to drop into a pit which is heated by the pistons themselves as they come out of the furnace—no cold air is allowed to strike them.

PROCESS OF PISTON PRODUCTION

The first machining operation on the piston is to open the end. This is done on a Bardon & Oliver special opening machine. One machine such as that shown herewith faces and bores 100 pistons per hour. The piston heads are then rough turned and rough faced on a Jones & Lamson double spindle machine such as that illustrated above. This machine can handle 80 of these pistons per hour.

The piston pin holes are then cross-bored, as shown herewith, on a Garvin cross-boring machine. This machine cross-bores and line-reams 80 pistons an hour, and puts them in shape for the finish turning operation, which is shown above. This is done on a 16 in. Sundstrand lathe. One operator can run two of these machines, finish turning 160 pistons an hour.

The production line along which these pistons travel is shown in Fig. 6. This shows the line all the way from the opening operation to the ring grooving operation. Gravity conveyors are used to keep the cost of transporting the pistons from one machine to another to an absolute minimum. This method of using gravity conveyors has shortened up the time considerably, as compared with the older method of using the portable racks.

Another 16 in. Sundstrand lathe is used for rough turning and finishing the ring groove. This machine is also capable of 80 pistons per hour, the ring grooves being rough turned and then finished in one operation. The oil hole drilling operation is of interest because it is done on an angle. A special fixture is utilized for this work, this being a No. ½ Avery ball bearing drill press.

The illustration above shows a new type of universal oil hole jig which is adaptable to all types of pistons. This has greatly reduced the tooling up cost for various service jobs. It has eliminated the necessity also of making separate jigs for the different varieties of service pistons which go through production.

A battery of Norton & Landis external grinders takes care of the grinding operations. Each grinder averages from 75 to 90 finished pistons an hour. The grinding limits are the regular commercial tolerances of plus or minus .0005 in. After this operation, the pistons are gaged on an amplifying gage.

With the great number of cars on the road and the increasing number of annual overhauling jobs, this replacement piston business has been mounting to a size which has not been appreciated even by those who are fully informed as to matter in the trade.

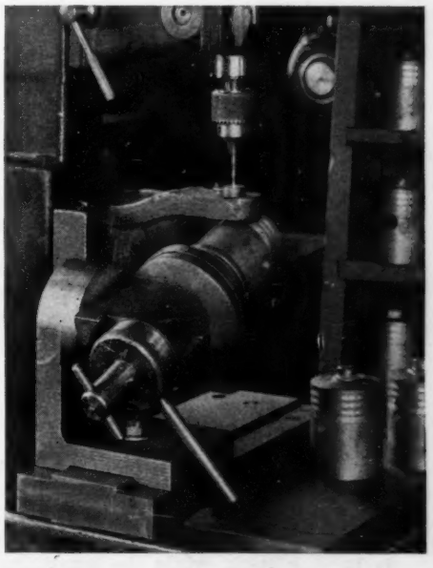
Education among car owners as to the value of piston replacements and cylinder regrinding, not only to secure better performance from the engine, but also to increase engine life by preventing leakage of fuel to the crankcase or oil to the combustion chamber, has been increasing and has resulted in a vast amount of business to garages and service stations all over the country along this line.

Know How They Are Made

ORDINARILY there is quite a difference in the manufacturing methods of factories and repair shops. This is so, of course, because in the former instance, uniform production is the prime essential, while in the latter, operating methods are considerably varied.

There is, however, much in the manufacturing methods used by the maker of automotive parts of interest to the repair shop. The better a mechanic understands the manner in which a piston, for instance, has been made, the better able he is to fit such a piston in a cylinder.

At times a shop, especially a large one, is confronted with the problem of making a set of pistons for an obsolete model engine and in such a case it is a distinct advantage to have on hand information which tells in part at least how a factory handles such work, though it is understood, of course, that the repairman can follow the methods only to a certain degree.



Oil hole drilling operation on a special oil hole jig adaptable for all types of pistons

Driggs Light Car New American Product

Engine a Four-Cylinder 2⅝ by 4½ in. Rated at 11 Hp. Tests Said to Have Shown 30 Miles Per Gallon of Fuel

THE production of an interesting new four-cylinder car will shortly be started at the New Haven plant of the Driggs Ordnance & Mfg. Corp., New York City. The car is called the Driggs and sells for $1175 for the touring, with $100 additional charge for the special roadster or sport model. A sedan model will be brought out shortly.

Before the Driggs concern decided to manufacture this type of car the automobile field, foreign and domestic, was surveyed. It was found that in Europe, because of high taxes and other economic conditions mentioned on page 13 of this issue, foreign motor car builders were turning their attention to the production of a light weight, economically maintained and operated automobile, and that this type of motor car had become very popular.

Believing that there was room in the American field for this type of car and that in its New Haven plant it had facilities for building such a car at a moderate price, the Driggs company started experimental work.

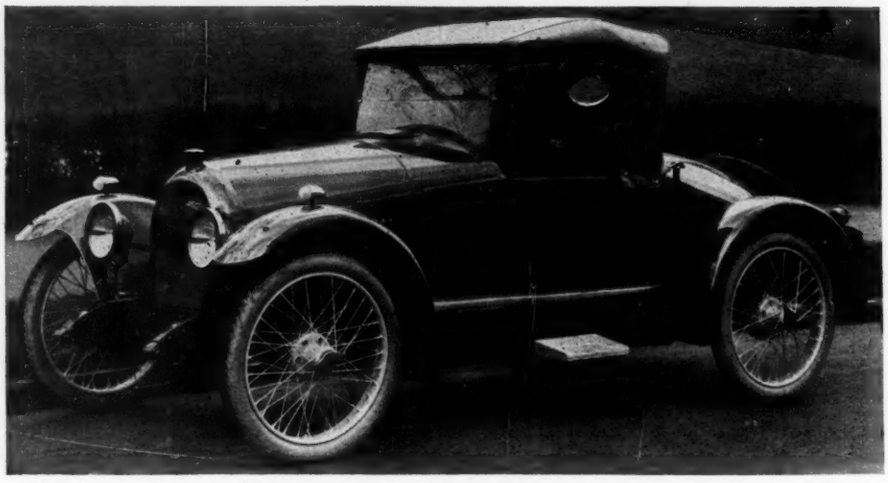
MAXIMUM POWER ON MINIMUM FUEL

The result is a car in which all of the features incorporated in the light weight, economically operated European cars have been attained with the addition of many improvements. In order to obtain sufficient and reliable power on a minimum gasoline consumption, the car is designed with a special small bore and long stroke engine. This model, while rated at about 11 hp., actually delivers 18 hp., it is said. The bore is 2⅝ ins. and the stroke 4½ ins. Several tests, made with experimental cars convince the manufacturers that the Driggs will run under ordinary circumstances at least 30 miles to a gallon of gasoline.

To further minimize the up-keep cost of operation the company is using alloy steel to produce a vehicle which when fully equipped weights a trifle more than 1600 lbs. Attention has also been given to securing accessibility of the parts most likely to require attention or replacement.

CAR DETAILS PERFECTED

The engine is three point suspended. Ignition is by battery with the option of a magneto. Lighting and starting is by the Gray and Davis system. The clutch is Borg & Beck, while the transmission is of the sliding type, with three speeds forward and reverse. Service brakes are of the external expansion type,



Three-quarter view of the Driggs light car. The rear springs are quarter-elliptic cantilever of the reversed type

foot control. In the emergency brake the internal expansion method is used.

The frame is pressed steel. Front springs are semi-elliptic, but rear springs are of the cantilever type, extending from the rear end of the frame forward to the axle. The object of this type of rear spring is to produce the effect of a longer wheelbase. The company will manufacture its own rear axle, which is of the three-quarter floating type, with Timken bearings. The front axle is of the drop forged I-beam type with Timken bearings.

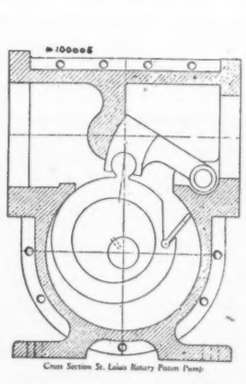
The pump and splash system of oiling is used, and cooling is by the thermo-syphon method. The gasoline tank, having a capacity of 10 gallons, is located in the rear, with vacuum feed.

All three styles of bodies are mounted on the 104-in. wheelbase chassis, and are painted blue. The upholstery is of tan leather.

St. Louis Gasoline Unit Uses Rotary Pump

A NEW type of visible gasoline dispensing unit has been placed on the market which incorporates many novel features. The unit is called the St. Louis Visible Gasoline Unit; according to the manufacturers, the St. Louis Pump and Equipment Co., St. Louis, the most noteworthy feature of the improved apparatus is the pumping element, which consists of an adaptation of the well-known St. Louis rotary piston pump. This is said to be machined to such close limits that though the pistons and cylinder do not make actual contact, the pumping action is powerful and accurate and will remain so for years. Another feature worthy of mention is the fact that all the straining screens are of monel metal and are guaranteed to be non-corroding.

The pumps are made in both the hand and power operated types, the latter being a combination and so designed that the change from one to the other can be made instantly. As all the openings, tubes, and passages of the device are ex-



Cross section of the St. Louis rotary pump and exterior view of visible gasoline unit

ceptionally generous in size, and as the new type pump is designed for high capacity, the assertion is made that gasoline may be delivered to the car tank at a rate of 20 to 25 gallons per minute. Despite this high speed, the measuring and recording elements are of such sensitiveness and accuracy that errors in metering and recording have been practically eliminated.

The unit is finished in a color scheme of red and black baked-on enamel, and has been so designed that it will accurately and visibly discharge 5 gallons of gasoline at the filling of the glass measuring chamber. If intermediate quantities are desired, a unique quantity indicator enables the operator to stop with accuracy and precision at the desired point.

The casting on top of the measuring cylinder hinges back, offering accessibility to the inside of the measuring cylinder for cleaning, adjustment, and other purposes. Likewise, the steel guard protecting the glass measuring cylinder is hinged so dust can be removed. A triple lock on the unit closes the clamp on the hose, the operating mechanism and the electric switch.

The glass measuring cylinder is the result of numerous experiments on the part of glass manufacturers to produce a cylinder accurate in dimensions, clear, tough in texture and still possessing high fire-resisting qualities.

A Battery Ignition System With Means for Controlling Efficiency

FOR purposes of explanation and comparison the Macnish ignition system may be said to be based on the present widely used, automatic-advance closed-circuit system. But combined with the usual mechanism of this latter type, there is a simple control means which has a surprisingly large effect on the amount of spark at the plug for a given amount of current.

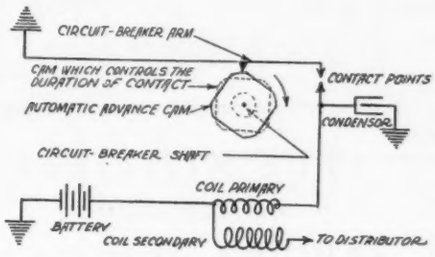
As shown in the circuit diagram, the new system has a circuit-breaker arm and an automatic-advance cam, and also a governor operating this cam to produce advance and retard of the spark. All of these parts operate essentially as in the ordinary closed-circuit type. Therefore, in the matter of breaking of the circuit the new system and the ordinary closed-circuit system are identical, and both positive in timing the spark.

But in the matter of the closing of the circuit, they differ very decidedly in their effect on the period of time the contact points remain closed. Instead of allowing the contact-points to remain closed through the same number of degrees of cam rotation at all speeds, as in the closed-circuit type, control means are provided by which the circuit remains closed through a small number of degrees at low speeds and through a progressively larger number as the speed arises. In other words, the period of time allowed the coil to remain in circuit at any given speed is under control.

CONTROL CAM, INNOVATION

A control cam, shown by the dotted line similar to the automatic-advance cam and placed close under it, comprises the control means. Cam and governor parts are so related that, as the speed changes, the control cam turns through a partial rotation with reference to the automatic-advance cam, with the effect of changing the length of arc through which the contact points remain closed. The effect is the same as though the flattened portions of the automatic-advance cam, as used in the closed-circuit type, were increased and dimensioned with rising and falling speed.

The reason for this is that the control cam acts merely to hold the lever off-contact after the other cam has lifted the lever, and in operation the control cam slides across and out from under the lever-shoe without any drag or shock.



Circuit diagram of the Macnish ignition system

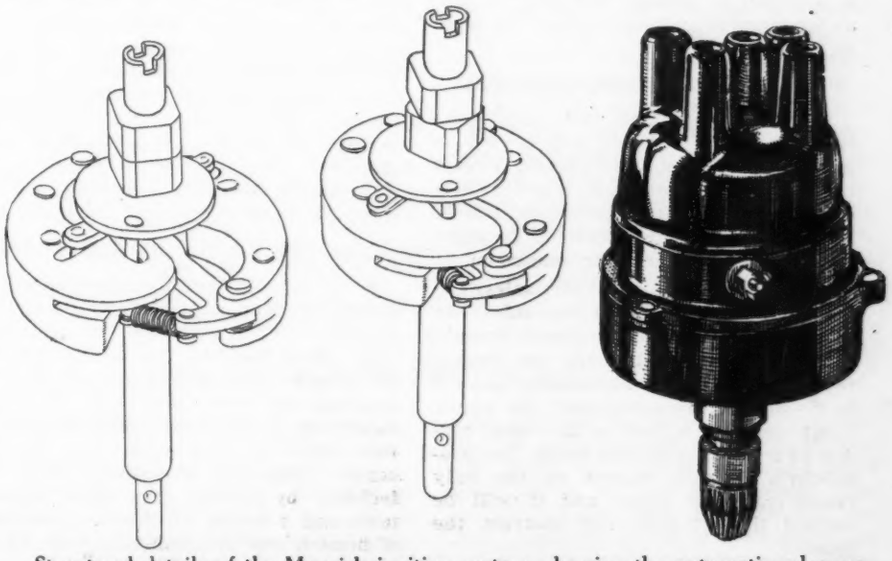
In forming an idea as to the cause of the differences in spark energy for a given amount of ignition current in the closed-circuit type and the new type above described, it is to be remembered that in the former the coil and cam must be designed to give a good spark at the highest speeds. The result is that at low and medium speeds the coil is held on contact at each sparking period a much longer time than necessary, and the amount of current drawn from the battery is out of all proportion to the amount needed—and actually utilized—to get the spark.

In the Macnish system the control means regulates the length of time the contacts are held closed. The current stops when the coil is saturated. It need hardly be pointed out that the resulting spark is exactly as heavy as though the current were allowed to go on wasting itself by passing through the coil after the saturation point is reached. This ignition system is made by P. R. Macnish, 937 Hearst Bldg., Chicago.

Highway Legislation Hits Snag in Phipps-Dowell Bill

Washington, D. C., July 5—Highway legislation has struck a snag here owing to the passage of the Phipps-Dowell bill in the House this week, providing for continuation of the Federal aid system with a system of interstate roads and a commission to direct the work.

The Senate has this bill and the Townsend bill pending. It is a question of parliamentary tactics which shall have the right of way in the Senate. It is believed that Senator Townsend will effectively block the Dowell bill in the Senate unless the essential principles of his measure, endorsed by the National Automobile Chamber of Commerce and other automotive organizations are accepted in amendments.



Structural details of the Macnish ignition system, showing the automatic advance cam in two positions. Right, distributer cover and gear drive

Laying Out An Efficient Salesroom

Keep Trouble Out of Sight — *Take Office Out of Salesroom*
Four Simple Arrangements — *Equipping the Office*
A Cash Register Saves Time

REGARDLESS of the plan used to separate the salesroom from the repairshop, it is absolutely essential that there be a division. There are a number of reasons why such a division is necessary.

Perhaps the first of these is to keep your "trouble"—and every tire dealer has more or less trouble from time to time—out of the salesroom. Remember the old saying "Out of sight, out of mind." The less your customers see of trouble the less they will think about it and the better it will be for you.

Never allow blown-out tires, unfinished repairwork, or adjustment casings to remain in the salesroom. Get them back of the partition or counter where they rightfully belong.

Another reason for having the two departments distinct is that your men will work better when undisturbed. You don't want your customers wandering around the repairshop interfering with the work and getting their fingers caught in the gearwheels. No matter how you may strive to avoid it, there will always be a certain amount of dirt and what appears to be disorder in the repairshop. A partition or counter will keep all this as far removed as possible from the sight of the customer.

FOUR SIMPLE ARRANGEMENTS

Illustrated herewith are four plans that have been designed with a view to giving the maximum room and display facilities in the minimum space. Three of them are arranged for salesrooms 18 by 25 feet, and the fourth is arranged for a somewhat narrower salesroom.

Plan "A" shows a corner salesroom with display windows on two sides. In this plan, the showcase is placed directly in front of the door and the tire display rack on the far wall. The counter is used to divide the salesroom and the repair department has a gate in the center hidden by a tire in a display stand. The proprietor's desk is placed in the only remaining open space and it will be noticed that it does not obstruct the counter.

Plan "B" shows a somewhat similar arrangement except that the store is located in the center of the block and is arranged with show windows on each of the doors. In this case a most effective arrangement may be attained by placing two somewhat smaller tire racks against the side walls. The showcase is directly in front of the door and serves to hide the gate. The counter is free for its full length and the bins built in the front serve very well for tube display.

The Efficient Salesroom

NEXT to a clean, spotless store with attractive merchandise, the most important consideration is to have a really efficient arrangement.

This means a store that is not too wide and not too narrow. It means proper disposition of the various tire racks, display fixtures, showcases and desks.

Such things cannot be placed hit or miss in the store; their places must be planned.

And because experience is the best basis for proper planning, these articles will be found intensely practical.

Mr. McMinn planned his store TWO MONTHS before he got the result for which he was seeking. Since then it has not been necessary to change anything for more than TWO YEARS.

TAKE OFFICE OUT OF SALESROOM

A slightly different arrangement in which the door is at one side is shown in plan "C." In this case, the desk and other office facilities are placed behind the counter and this perhaps is the best location for them after all. The arrangement in this plan would ordinarily leave quite a large open space in the center. This can be utilized most effectively by putting in a small square table and a couple of chairs. A basket of flowers, real or artificial, on the table will add an attractive touch.

It is difficult to store and display tires in a salesroom which is narrower than 18 ft. Nevertheless this has been done in plan "D" where the salesroom is only 15 ft. wide and 31 ft. long. Here the tire display rack is divided into two sections of 11 ft. each with a 3 ft. opening in the center for a section of shelves on which to display a stock of tubes.

Three showcases are arranged in front of the tire rack. It will be noticed that they are placed at an angle. The reason for this is that it puts them directly in front of the customer entering the door. In other words, each of the three is equally prominent. Another reason for the angular arrangement is that it provides plenty of room for the removal of tires from the racks and also makes it unnecessary for the salesman to walk the length of the three showcases in order to get out from behind them and greet the customer.

A store such as this is very often best separated from the repairshop by means of a full length partition inasmuch as any counter that might be used would be almost too short to be of real value.

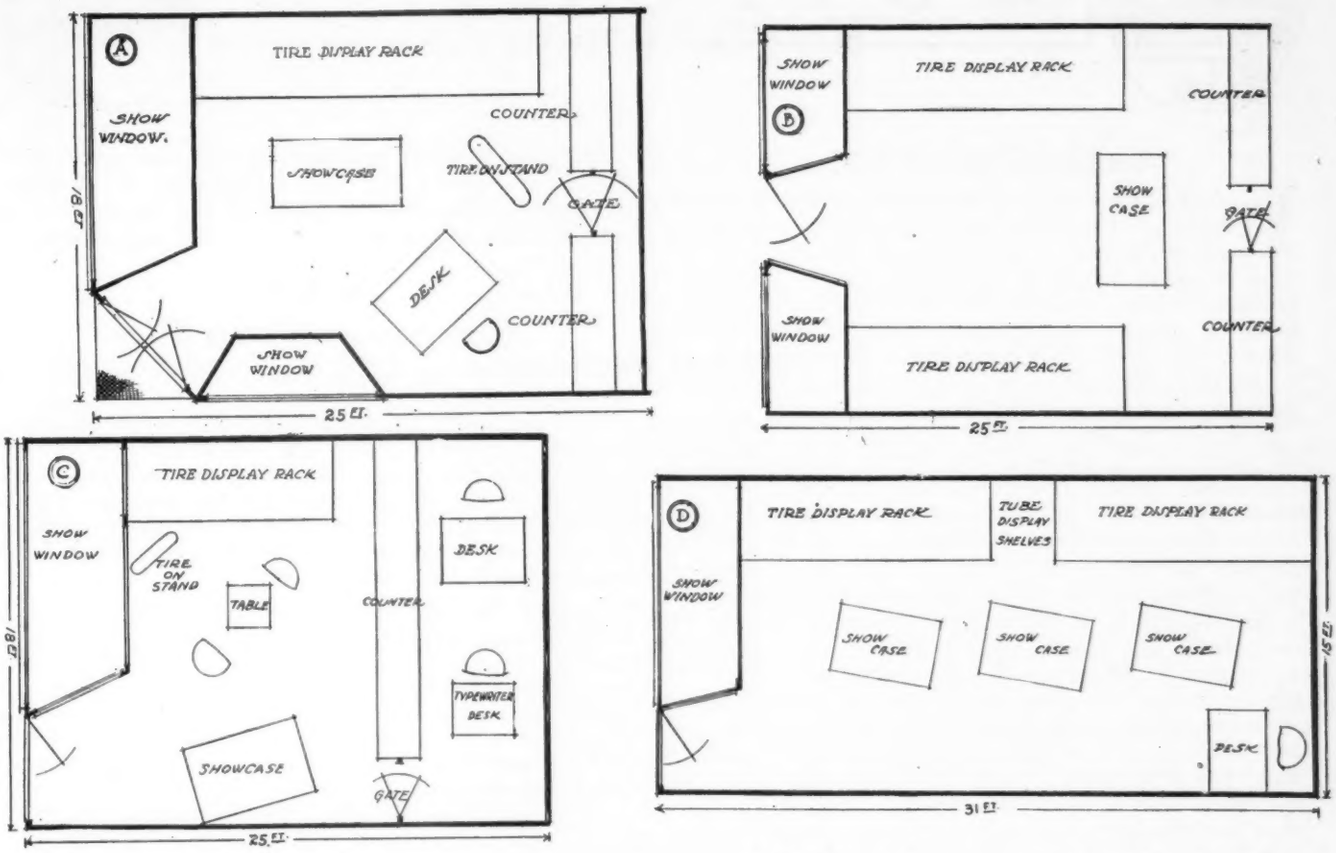
EQUIPPING THE OFFICE

The elaborateness with which the office is equipped obviously will be dependent upon the extent of the business. In any case, it is advisable to use as little equipment as possible in order to conserve space to simplify matters as much as possible.

Probably one necessary piece of equipment will be a flat-top desk for the proprietor or the person who directs the destinies of the business. Besides being old-fashioned and years out of date, the roll-top desk serves more as a catch-all for junk than it does as a piece of business furniture. Therefore, choose the flat-top desk which is always easy to keep clean and for this reason presents a good appearance. It is impossible to have the top littered up with a heterogeneous mass of papers—one of the advantages of this type.

It will be necessary from time to time, to talk over repair jobs and perhaps extensive equipment requirements with customers, and therefore provision

Tire Salesroom Plans Designed with View of Giving Maximum of Space and Display



Plan A—An effective arrangement for a corner salesroom with display windows on two sides. Plan B—This arrangement is for a store that is located in the center of the block and has show windows on each side of the door. Plan C—This plan is also for a store in the center of the block but with the door at one side. In this case the office facilities are behind a counter. Plan D—It is difficult to store and display tires in a salesroom that is narrower than 18 ft. However, this arrangement can be used in a store that is only 15 ft. wide

should be made for this. A comfortable chair at the end of the desk is one solution of the problem.

The telephone will probably stand on the desk where it is equally available to employees and customers. Customers frequently require the use of the telephone and it is a good business investment to allow them to make as free with it as they may desire.

A CASH REGISTER SAVES TIME

A typewriter desk may or may not be necessary, according to the amount of circular and correspondence work carried on. The same may be said for mimeograph or other duplicating equipment. Such devices are comparatively inexpensive and will very soon pay for themselves by increasing the earnings of the business.

A safe may appear to be a luxury, but it is not. Even though there may never be more than a few dollars in currency to put in it at night, it serves as a safe repository for business records. Your "accounts receivable" for example, are just as valuable as cash, and in the event of fire might be entirely lost or so badly damaged as to be worthless. A safe protects them.

The cash register is always a wise investment. In addition to providing a safe place for money receipts, it adds greatly to the appearance of a store and impresses customers with the business-like manner in which the organization operates. Furthermore, the cash register will give a complete itemized statement of every transaction made by each employee. From the cash register records it is a simple matter to compile income tax reports and other data of similar nature which is required from time to time by the banks with whom you may be doing business.

Perhaps the best, simplest and most efficient method of bookkeeping involves the use of cards. Make out a card for each account and file the cards alphabetically in a drawer, keeping a file for "live" accounts and one for "dead" accounts. When an account is closed the card can be removed from the former and placed in the latter, so that the person who keeps the accounts straight has always the minimum number of "live" cards to handle. This method is better than the book method because it is more convenient to handle.

The Tire Service Station, Suitable Types of Jacks, Portable Tool Box and Rim Machine Will be the Subject of Mr. McMinn's Article Next Week.

Carry a Spare Tire to Sell to Stranded Motorists

While in the salesroom of a garage the owner received a call to bring a tire to a customer who was stranded some distance out in the country. He asked me if I would like to take a ride. He got the tire and was about ready to start when I suggested that he take along another tire and a couple of tubes. He was a bit skeptical but agreed to try the stunt and the result was the sale of both tires and tubes. He has repeated the stunt successfully several times since. Why not sell a spare when the driver has just had to pay for a trip in the country because he was not carrying one. Often if one of his tires is bad, another is also

EDITORIAL

Accessibility of Cars

IT often has been stated in these columns that it is not always the actual repair operation on a car or truck which makes the cost seem excessive, but the time required to get at the repair. It is difficult to explain to the customer the reason for a bill that seems to him excessive, and while our makers have done much in the last years to make automotive vehicles more accessible to the service man, there still remains much work to be done.

It is felt by many service men that a vast amount of time could be saved if some other arrangement of the instruments on the dash were utilized. Anyone who ever has had to remove a body from the frame of a car knows what a job it is to undo the endless amount of wiring, etc. Also, when one or more of the instruments are out of adjustment it means the repair man must go through movements which would make the best contortionist envious.

Perhaps a grouping of the instruments and their placement on the steering column or within in the wheel center is an answer to the service question as it affects these parts. Such construction has the advantage, too, of making it easier for the maker to assemble the chassis and mount the body. It is to be hoped that the coming year may see developments along this line.

The Factory Could Help

WHEN there is a falling off in the efficiency of a dealer's business, particularly in the maintenance division, the dealer or his associates are not always to blame. The dealer and his organization may strive to do everything within their power to satisfy the customer, the "meal ticket" if you please, only to get a set back from the inability of another institution to co-operate. In this case we refer to the factory which makes the car.

P. E. Chamberlain, well known to the industry through his talks throughout the country to dealers' associations and other bodies on the intelligent selling of service, relates an incident which happened recently and which goes to show what some dealers are up against in their efforts to better service conditions. Mr. Chamberlain says:

"In Louisville last week a parts department manager complained to me that he had waited seven weeks for a simple part—had been damned up one side and down the other by the customer who needed it, and could get nothing out of the factory except a curt notification that they would fill the order when they could. Will that customer buy another car of that make? I'll say he will not. If that condition should become more or less general with the meal tickets of that particular make of car in Louisville, that very same factory would want to know—from another department, the sales—why the dealer wasn't getting business. It probably would not recognize the fact that it was essentially to blame.

"It is an interesting study to note how very often the very purpose of the investment is defeated through lack of understanding of the importance of ALL points of contact—not just the sales point of contact."

Community Camp Sites

IN many of our middle western states we find free camping sites for motorists. Usually these sites are made possible through the efforts of merchants, commercial men's associations, chamber of commerce, motor car dealers and others. The communities which have tried out these camping sites are strongly in favor of them. Not only do they add to the revenue of the community, but they help put that community on the map.

Among the leading merchants to gain from such undertakings are the motor car dealers. Naturally, many car owners when stopping at the community camps have a certain amount of repair work to be done, and, while motorists as a matter of necessity might make their own roadside repairs, they seek the service station or repair shop at the end of the day's run for permanent repairs.

Often, too, the motorists will buy tires, tubes, lamps and other accessories. It seems that dealers in localities where a good motorist camp site is available, should get together with other business men of the town and see what might be done. If it has proven beneficial to dealers in some localities, it is logical to believe it will prove so in others.

Using Space to Advantage

IN these days of building curtailment no one wants to do business in a building too large for the purpose. On the other hand, no one wants to be cramped for room. But a little investigation often will reveal that many of our service stations are not operating on the most efficient sort of plan when it comes to utilizing space. This is particularly true of the parts departments.

Careful planning and judgment in the selection of racks and bins will go a long way towards getting more stock housed on the same floor area. It is an easy matter to get such parts as fenders, wheels, torque arms, etc., scattered over considerable floor area just because they are bulky and difficult to handle. But correct arrangement of the stock room will cut down the floor area necessary and in many instances make it possible to get more within the same space.

Equipment often has much to do with it. A good modern parts rack often will store twice or three times as much as it is possible to get into a home-made rack. Makers of stockroom equipment have studied the problem and there is little left which could be improved upon by any equipment built in the shop.

Tractors Vanquish Horses At Fargo Demonstrations

Iron Ribbed, Oil Drinking Successors to Dobbin Make Great Showing at North Dakota Trials; Animals Die; Teams Withdraw

By David Beecroft

FARGO, June 20—That teams made up of six and eight horses cannot compete with farm tractors in plowing was amply shown in the three-day demonstration of tractors and horses six miles from this city in the flat gumbo lands of the Red River valley this week. The demonstration was staged primarily by the manufacturers of tractors to get data on what a horse can do compared with what a tractor can do.

Forty models of tractors and 11 outfits of horses started in the competition. At the end of the first day three of the horse plowing outfits had withdrawn because of the intense heat and at the end of the third day when the demonstration was supposed to be over, only five of the horse teams remained in the competition and are yet unfinished, whereas the tractors finished the work, some of them in one day, and all of them in less than two days. Three of the horses have already died from sunstroke and two others may die.

Superiority of Tractors Proven

For some time the horse association has been rubbing the tractor makers against the grain, endeavoring to establish the fact that plowing with horses is cheaper than with tractors. The demonstration was staged to counteract such propaganda. The demonstration was supposed to be over tonight but as the horses have not finished and may not finish for two days more, no official report has yet been compiled and the official results will not be known until the middle of July.

While figures are not yet ready, the general results as observed for three days at the demonstration are convincing enough. The demonstration was participated in by 40 tractors each having to plow a 10-acre plot and then prepare it for seeding by cultivating it with disk harrows, toothed harrows, and finally draw a seed drill over it although no seed was sown. Each of the horse outfits was given the same task.

The tractors were all sizes, two,- three,- four,- six- and eight-plow types. All of the leading tractor makers except Samson and Moline competed. There were 26 different makes of tractors, which is a relatively small number compared with nearly 60 different makes that competed a year ago and two years ago in the demonstrations. Many of the well established firms competed including such as Fordson, Case, Wallis, Avery, Twin City, Rumely, Hart-Parr, International Harvester, Allis Chalmers, Bates, Cletrac, Holt, Best, Emerson-Brantingham, Fox, Liberty, Waterloo Boy, etc.

No Greater Fame Than That They Should Die

TRACTORS in Fargo demonstrations prove themselves more fitted to the tasks in intensive farming than their makers claimed them to be; while horses, in competition on equal tasks, fail signally, some dying in their efforts, others withdrawing from the unequal tests.

It is proved beyond dispute that horses cannot compete with tractors in heavy plowing and in other operations required to prepare the soil for seeding.

Those teams that did not withdraw from the field had not, two days after the demonstrations were officially declared ended, completed the work set them to do. Tractors finished their work in less time than was allotted them.

The soil to be plowed was dead-level black gumbo covered with weeds waist high. The ground was hard and the weather excessively hot. The tractors were started at eight o'clock in the morning and excepting an hour for lunch worked continuously until seven at night. It was the first time tractors have ever been given such a long test in an American demonstration. There was an observer on every tractor who reported every stop and measured the amount of gasoline or kerosene used, the time needed, and amount of water used for radiator and for mixing with the fuel. An effort was made to get the cost of the grain, hay, etc., needed by the horses.

The oustanding lesson of the demonstration, in the absence of the official report, is that the greatest advantage of the tractor lies in its ability to do work in the hottest weather, when it is too hot for horses and also in that a man with a tractor can accomplish four and five times as much as he can with horses, depending on the size of the tractor and the number of plows it pulls.

Some of the biggest tractors pulling eight and six plows had the 10-acres plowed and seeded early in the afternoon. The Aultman-Taylor with eight plows plowed the 10 acres in four hours and 30 minutes. The Avery with eight plows did it in slightly less than this. The Twin City 20-35 model with six plows and handled by one man did the work in practically the same time.

Tractor Use Solves Labor Problem

Smaller types of tractors like the Cletrac with three plows and generally expected to plow at the rate of an acre an hour did better than this and had the 10 acres plowed before the day was over, notwithstanding the bad condition of the ground which made the plows clog up so that they had to be washed off with water on the mold boards at each end of the field. Two-plow tractors like the Fordson did not finish the 10 acres the first day, having a little left for the second day.

With a six-plow tractor one man can plow 25 acres a day, whereas that same man driving a six-horse team can scarcely plow five acres a day. This multiplying as high as five fold the working capacity of the man is the greatest lesson of the demonstration, particularly when farmers are short of help and are endeavoring to do most of the work themselves.

The amount of fuel used by the tractors will be given in the official report, but unofficial figures showed that while some of the older designs of tractors took more than four gallons of kerosene per acre, some of the newer four-cylinder engine designs took but two and a half gallons per acre and a few came

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Condon Law to Rob Thieves of Stolen Automobile Cash

New Measure Effective July 1 Will Protect Car Owners In Michigan

DETROIT, July 1—Registration blanks by which sales of all automobiles in the future will be registered under the terms of the Condon law passed by the last legislature, have been sent out from the office of the secretary of state. The law is declared to be the most forward step yet taken toward breaking up automobile thefts in Michigan. More than 460,000 blanks have been mailed.

Under the terms of the new law which was passed at the request of the police department and the Detroit Automobile Club, owners are required to register what amounts to an abstract of title proving their ownership. The law becomes effective July 1. On and after Oct. 1 no new motor vehicle can be purchased nor a second hand car sold or traded without a certificate of ownership figuring in the transaction. Purchasers of new cars will receive a certificate when they apply for their licenses on payment of an additional dollar. In the case of second hand cars, the certificate will be endorsed by the last owner and turned over to the new owner who in turn will send it to the secretary of state and receive a new certificate.

Present owners who make no attempt to transfer ownership must obtain their certificates prior to July 1, 1922, after which date the secretary of state is forbidden to license any cars which are not registered under the terms of the Condon law.

The law also provides that sheriffs and police chiefs report immediately to the secretary of state all motor vehicles reported stolen. The secretary will keep a record of these cars and keep monthly a list of cars stolen and recovered. A provision also forbids dealing in used cars without a license from the secretary of state after Jan. 1, 1922.

Severe penalties are provided by the law. For driving a car after July 1, 1922, without an owner's certificate, the punishment is a fine of from $5 to $50. Any person who makes a false statement in his application for a certificate or who has in his possession a vehicle which he knows or has reason to believe, has been stolen, is subject to a maximum fine of $5,000 or imprisonment for 10 years. Any person making a false affidavit shall be guilty of perjury and is subject to the penalties therefore. Any person who sells a motor vehicle after Oct. 1, 1921, without complying with the terms of the law shall be deemed guilty of a felony and fined not more than $1,000 or imprisoned not more than 10 years.

REO ADDS COAST BRANCH

Detroit, July 1—Several changes are announced in the Reo Motor Car Co.'s organization, including the establishment of a branch house in San Francisco to handle business in California and along the coast. Carl Parker, manager of the Lansing-Reo branch has been transferred to the sales organization at the factory and is succeeded by George Hopkins.

The California branch will be managed by P. L. Emerson, who has been an assistant to Sales Manager R. C. Russchaw and an auxiliary to the branch in California. A large wholesale and retail establishment in Los Angeles will be under the management of Byron C. Foy, now assistant manager of the Detroit-Reo branch. C. P. Green of the engineering department will be in charge of service at the San Francisco branch. Establishment of the western branch completes a chain in Reo branch houses extending across the continent, the others being at New York, Detroit and Chicago.

Gravity Aids Sheriff to Gas Flivvers

CHARLES CITY, Ia., July 2—An oil station without pumps is being built here by C. C. Gray, sheriff of Floyd county. A big storage tank with a capacity of 18,000 gallons of gasoline is placed on the hill about a block away on the Charles City Western railway right of way, and the gas will flow to the meter at the station by force of gravity. The station is located on the Red Ball Route and the new pavement project of the North Iowa Pike.

FORCES JOIN ON TOWNSEND BILL

New York, July 1—Joining forces with the National Automobile Chamber of Commerce and the Rubber Association of America, the Motor & Accessory Manufacturing Assn. has sent to its members a bulletin in which it declares that the United States highway policy has reached the cross-roads and that Congress must decide whether or not it will adopt President Harding's recommendation for a Federal highway commission as proposed in the Townsend bill. The bulletin states that to eliminate the plan for a Federal highway commission, as suggested in other legislations introduced in opposition to the Townsend bill, would be to rob America's new road policy of its essential strength and efficiency.

FIRST LOVE HOLDS BUICK

Detroit, July 1—David Buick, of Detroit, founder of the Buick Motor Co., of Flint, has reentered the automobile business as head of the Lorraine Motors Corp., of Grand Rapids and has designed a new car which will be put on the market shortly. The car will be marketed as the Lorraine, although it will be an entirely different product from that which the Grand Rapids organization has been manufacturing.

Overland Plant Sets July Schedule Above 12,000 Cars

Thirty-day Sales From May 16 to June 15 Mounted to 18,000; Adding to Force

TOLEDO, July 2—The automotive business increase which has forced the enlargement of working forces at the Electric Auto-Lite Corp., the Champion Spark Plug Co., and has necessitated the working of a night force at the plant of the Mountain Varnish Co., was emphasized when the Willys-Overland officials gave the word that the July production schedule was for 12,000 cars as a minimum.

If production can be speeded up as the month rolls along it will top this number by several hundred; and then orders will not be met. In June Overland went far in building up its organization. The production of cars for the month was fully 100 per cent above the number turned out for May. Sales Manager A. C. Barber announced this week that the Overland sales from May 16 to June 15 had amounted to 18,000 cars. Actual delivery in the first two weeks of June exceeded 6,500 cars, according to his report.

For the first time in months the Willys-Overland Co. is advertising for all kinds of mechanics. They are being absorbed into the forces at the plant here at the rate of about 200 a day.

A drive-away of 150 cars on Friday illustrated the way things are going. Of these cars 35 went to Columbus and 25 to Cincinnati and the rest to intermediate and smaller towns.

The Mountain Varnish Co., is practically a subsidiary of the Overland. The calls for paint and varnish for the automotive trade has forced the plant to get into top speed production.

The Auto-Lite factory here has been crowded with work for more than a month and it is noticing a gradual increase every week.

IOWA ENTERS A. A. A. FOLD

Waterloo, Ia., July 1—In order to carry out the plan of the American Automobile association for the establishment of a state organization of the same kind as exists in Minnesota, Illinois, Michigan, Indiana and all other states to the east, Malcolm MacKinnon, field representative of the national organization has been instrumental in filing articles of incorporation of the Iowa State Automobile association, with state headquarters in Waterloo. According to the articles filed the first meeting of delegates of the state association will be held the second Tuesday in July, 1922.

NAME AUTOMOBILE SHOW DATES

New York, July 1—Dates for the 1922 New York Automobile show have been tentatively fixed for Jan. 7 to 13. The show will be held in Madison Square Garden. The Chicago show will open in the Coliseum Jan. 28.

Tractors Vanquish Horses at Fargo Demonstrations

Iron Ribbed, Oil-drinking Successors to Dobbin Make Great Showing at North Dakota Trials

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very close to using but two gallons per acre. The fuel consumption is a little higher than usual, due to the many stops to clean the plows. One tractor, that had four hours and a half to plow the ten acres, stopped 84 minutes for cleaning the plows. This increased the fuel consumption. A great many of the machines used kerosene; the others gasoline. There was a good representation of creeper types such as Cletrac, Bates, Best and Holt. A few other creeper types are being developed at this time by some of the other makers.

Tractors Essential for Summer Plowing

The psychology of holding a demonstration in North Dakota at this time of the year was primarily to show the value of the tractor for summer fallow land; that is, plowing and cultivating land that is not growing any crop this year, but which will be sown with wheat next spring. To get best results, the land should be plowed in the hot weather of June and July, when it is too hot for horses, but ideal for tractors. The case is similar to the winter wheat area of Kansas, where to get the best yield of wheat per acre, the plowing should be done in the hot days of late July and early August. In every section of the country there exists a similar reason for tractor plowing and it is only when these real reasons are understood that the farmer grasps why a tractor is more valuable.

The United States Department of Agriculture has recently compiled some valuable figures on what a tractor can do and at what cost. In a report based on the use of tractors on 286 farms in the states of Illinois, Indiana and Ohio, the average cost was placed at $18 per day to plow for a 10-hour day with three-plow tractor, and approximately $13 per day with a two-plow tractor. Those comparing the cost of plowing with horses and with tractor are apt to forget that the government estimates it costs $159 per year to keep a horse, this covering food, depreciation, interest, etc. It should also be borne in mind that while the average tractor on an Illinois or Indiana farm works about 31 days per year the horse on the same farm only averages 60 days per year.

The capacity of a tractor to perform a big share of the farmers' work is shown by other government figures which show that a three-plow tractor plows 80 per cent of spring plowing and 93 per cent of fall plowing and with a two-plow machine it plows 83 per cent of spring plowing and 88 per cent of fall plowing. These figures are a complete answer to the question as to how much of such farm work the tractor can really accomplish.

The demonstration here this week was poorly attended, not over 1,000 farmers attending the second or largest days. From the standpoint of attendance, the demonstration was a complete failure. No reason can be given for the small attendance other than that the farmers all know that a tractor will plow and the novelty of watching a Fordson or Cletrac has worn off. They came in tens of thousands a few years ago to see them but scarcely came in hundreds this year. Because of the poor attendance it is not yet certain whether the two other demonstrations which were to have been held this year will be held.

The number of motor car dealers selling tractors in North Dakota is gaining rapidly. One tractor maker, building one of the best machines on the market, said yesterday that 80 per cent of his dealers in this territory sell automobiles and accessories. Many of these dealers attended the demonstrations. They sell all makes of cars. Fords, Dodge, Buick, Overland, Hup, etc. The motor car dealer is making good in selling tractors. Some of the tractor makers are giving 25 and as high as 28 per cent discount. Many tractor manufacturers are looking for good motor car dealers to serve as tractor dealers and are not requiring that they give up any car agency when they take on the tractor.

The sale of motor cars was stimulated in this city following price reductions, some of the dealers having sold more cars since price reductions were made in June than they sold all the rest of the year up to June 1. Ford has had a bigger year in this territory this season than last. The accessory jobbing business has been at 75 per cent of last year.

Dodge Brothers Name 600 Daily Capacity for Year

Detroit, July 5—Dodge Brothers' capacity schedule, as given out by President Haynes, for the remainder of the year comes as a reassuring factor in the present unsettled conditions of the market. This plan since the reductions May 8, has been increasing production daily and is now hitting around the 600 mark. This output, President Haynes says, will be continued throughout the year and is based upon present orders and prospective demands. Dealers' stocks are exhausted, Mr. Haynes says, and the cars rapidly moving into the hands of consumers. The factory is far behind with orders and dealers from all over the country report prospects of a steady demand throughout the year.

STAN-PAR RECEIVERSHIP STANDS

Cleveland, July 1—Stockholders of Standard Parts Co. have voted down the plan of reorganization proposed by creditors. Both preferred and common stockholders agreed to hold out for an extension of the receivership until the depressioin is ended.

Reimported Truck Auction Is Small Stir in New York

Sales Prices Seem Fictitious Which Buyers Think Do Not Represent True Value

NEW YORK, July 5—Auction of 200 reconditioned army trucks reimported into this country by the Truck Company of America was started here June 29 and continued until July 1. Judging from the sales there was very little participation in the bidding by the public and the sales prices were seemingly fictitious. Macks of 5½ ton capacity sold for $2500; 3½-ton Packards sold for $2000; chain-driven 3-ton Whites for $1900 and 4-ton Rikers for $1800.

In the opinion of prospective buyers on the floor, the prices did not indicate anywhere near the true valuation of the trucks. A representative of one of the large truck manufacturers stated that his company was given the opportunity to purchase a certain make of truck in lot for $350 each.

Each truck was sold with a guarantee against defective parts within 30 days of the purchase. Arrangements were made by the auctioneers for the sale of the trucks under the part payment plan, representatives of finance companies being on the floor.

FIVE TO PLAN DENBY FUTURE

Detroit, July 5—Denby Motor Truck Co.'s creditors have named a special committee of five headed by J. H Johnson, president of the Peninsular State Bank, to formulate plans for presentation to the creditors of the company July 12 for funding the company's indebtedness. The plan in view is to ask the creditors to accept part payment in bonds and the remainder in stock in order that the company's statement may be placed on a bankable basis. It is also proposed to issue about $100,000 of class A bonds to furnish working capital.

The Kalamazoo company will continue in operation. It has debts of about $650,000 but is solvent and will prove an assured success if given an opportunity to work out its present difficulties, members of the committee declare.

WASHINGTON ASSOCIATION GROWS

Tacom, Wash., July 1—Although the association is only two months old, emblems of the Washington Automotive Trade Assn. are now flying in four counties of the state: Spokane, Pierce, Yakima and King, showing the intensive work on the part of the automotive tradesmen. The emblem displays a radiator with the words, "Your Protection."

SHOW FOR KOKOMO

Indianapolis, July 1—Arrangements are being made for an automobile show to be held September 5 to 10 at Kokomo, Ind. The Howard County Automotive Assn. is sponsoring the show.

Cleveland Dealers Loudly Preach New Creed—Optimism

Are a Unit in Their Belief That Coming Six Months Will Produce Increasing Sales

CLEVELAND, July 5—Cleveland retail automobile dealers are a unit in saying that the business in June was better than it was in May. A great many of the dealers visited said that the record for June this year was better than for a year ago. Others made the statement that their deliveries of cars for six months this year are greater than a year ago in the same period. Most of the dealers, who boasted about their deliveries, proudly displayed their books to back their assertions.

The big thing about the Cleveland retail dealer is that he is sure about his prospects for the next six months. Every man along Euclid avenue is certain that he is going to enjoy better business the next six months than he did a year ago. In fact he expects to go way ahead of the figures for the last half of 1920.

Wholesale dealers have been cheered by an increased demand by Ohio farmers for cars. They are buying better than they did earlier in the year. The crops are soon to be harvested and that is said to have an influence on the market. Dealers in small towns throughout the Buckeye state are coming here more frequently for cars this month than they did in May or in June a year ago.

June Their Best Month

At the Jordan-Ohio Co. the month of May was said to have been a good one but June was better. This company has enjoyed a great run since the price reduction, and June sales are ahead of those made in the corresponding month a year ago.

Rienking & Fintze, who have the Chevrolet and Moon agency, are particularly optimistic. James Fintze says that up to June 20 his firm had delivered more cars and earned a greater net profit than it did in the entire months of June 1919 and 1920.

"The used car is the big problem," says Mr. Fintze. "We could sell twice as many new cars if we could sell twice as many used cars. Most every driver in Cuyahoga county is a prospect for a new car, but when you solicit him, he asks immediately what the allowance will be on the used car. Out of every 100 cars sold by our firm, 95 represent trade-ins. About 5 per cent of our customers this year are first owners.

The Barnes Motor Co., the Dodge distributor here, is as busy as a bee. June sales are away ahead of May and ahead of the corresponding month a year ago.

The Avenue Motor Co., which has the Maxwell and Chalmers agency, also has done more business in the first six months of 1921 than it did in the same time a year ago.

The Studebaker agency here is another concern that has done more business this year thus far than it did in 1920. The Hupmobile agency also is having a spurt, the June sales running far ahead of May, and better than 1920.

The Auburn sales agency here is the No. 1 concern of the entire Auburn distributing corps in the United States. It has sold more cars than any other Auburn agency, according to P. R. Ward, the manager. Chicago ranks second. During May, 1921, this agency sold and delivered 40 more cars than it did in the corresponding month of 1920. More cars were sold the first three weeks of June this year than during the entire June of a year ago. The six months record is better than for the first half of 1920.

A. W. Barber of the Paige-Ohio Co., says that June is better than May and that sales ran ahead of the same month last year.

The Carris-Franklin Co. has been a heavy disposer of Franklin cars. June is ahead of the same month last year, and it is better than May.

L. L. Smith, sales manager of the Overland agency, has run his sales since the last price cut way above the corresponding period for 1920.

Portland Dealers Optimistic

Portland, Ore., July 2—That price reductions are nearing an end and that the automobile industry is getting back to a more stable basis than any time since last summer a year ago, is the belief of Portland automobile dealers, who are already laying plans for active sales effort during July. With the exception of a few stragglers who are expected to drop about July 1, it is believed the automobile situation has adjusted itself and that the uncertainty which has pervaded the market during the last month or six weeks is over.

Price Reduction Principal Object

Price reductions have been the principal object of attention on the part of the dealers for some time. Portland dealers do not deny that the general uncertainty has slowed up sales materially, or rather postponed them, for it is felt that there are an ample number of buyers, but that until they feel persuaded that the rock bottom has been reached, they will not sign on the dotted line. Thus far opinion among the Portland dealers is that the price reductions have not aided in sales, but it is believed this will last only until the public is assured that the bottom has been reached, after which there should be a general improvement. Some of the dealers, notably the Dodge and the Ford aggregations, have been benefited materially by the drops and have increased sales markedly.

Coast Sales Better Than Reported

San Francisco, July 7—The condition of the automotive industry in the Pacific Northwest, throughout Oregon and Washington, is better than has been reported, and is showing continuous signs of improvement, according to W. D. Patterson, head of Patterson Parts, Inc., of this city, who has just returned from a trip through those states, in company with W. H. Jahns, manufacturer of Jahns' quality light weight pistons. Mr. Patterson said:

"Mr. Jahns and I found the automobile trade in Washington and Oregon in fairly good shape. It is true that conditions are not all that could be desired, but those concerns selling dependable merchandise are doing a fair volume of business, with a steady, even though small degree of improvement. General business conditions are not in the precarious condition that some unfavorable reports lead those interested in the automotive industry outside these two states to believe,"

California to Invoke Aid of Law to Save Her Roads

State Automobile Association Claims Millions Have Been Lost in Light Paving

SACRAMENTO, Calif., July 5—Continuing its war upon the State Highway Commission's road building program and its work in the past, the California Automobile Assn. charges that the commission has wasted millions of dollars in following persistently an obsolete pavement design long after its inadequacy had been proved.

Not one of the 35 states which are conducting extensive road-building operations is building a pavement as thin as five inches, the association claims. Only six states are building as light as six inches, and all have a greater minimum width on trunk lines than has California, which has many pavements of but 16 feet and few more than 18 feet, which the association claims are entirely inadequate to the traffic demands of the rapidly increasing number of automobiles and motor trucks.

California was practically the pioneer in building paved highways, it is admitted by the association, but the Highway Commission is charged with not profiting by experience and the example of other states.

Of the five states with greatest automobile registration, New York, Ohio, California, Pennsylvania and Illinois, California is alone in building 16 foot trunk lines, none of the others building less than 18 feet and in most instances 20 feet. Pavements of these states range in thickness from six to nine inches, and it is charged the California plan permits poor mixtures of cement, making the pavements difficult to maintain.

As a result of this construction, the State Highway Commission itself estimates it will cost $7,253,259 to rehabilitate roads already built, some of them not more than three years old. The automobile association is demanding a program of wider and stronger pavements and is preparing to take legal action, it is said, to prevent the continuance of the program which it claims has cost the taxpayers of the state millions of dollars.

Building of Sales Morale Big Dealer Problem Now

Bankers and General Economic Conditions Promise Aid to High Powered Sales Forces

CHICAGO, July 5—Ezra W. Clark, of the Clark Equipment Co., Buchanan, Mich., has returned after a three months' tour of the principal mid-west and Pacific coast cities, bringing with him the twelve original paintings of "The Spirit of Transportation," which have been exhibited in each city under the auspices of the N. A. D. A.

The paintings were exhibited as a feature attraction before meetings of prominent bankers, real estate men, automobile and truck dealers, and other leading business men in each city, these meetings having been arranged by the local motor car dealers affiliated with the N. A. D. A. Mr. Clark spoke at these meetings on the place of transportation in the development of community and national prosperity, and called attention to the fact that the automotive industry has created a system of transportation as important to the country as railway and steamship transportation systems.

Motor Paper a Prime Issue

That banks consider automotive paper their best class of credit was one of the interesting facts brought out by Mr. Clark in a report on his trip.

"In one city," says Mr. Clark, "the vice president of the leading bank said that a study of all the commercial paper carried by his bank for a period of four years, showed that the losses on motor paper were less than those on paper of any other classification. This bank, as a direct result of this meeting, has added an additional half million dollars to the automotive credit account."

"Another banker in a Pacific coast city, declared that the motor car dealers were his best customers and their business the most desirable. Quite adroitly he called attention to the fact that a bank would be of little use to a community if all its customers were borrowers and that a certain percentage of depositors are necessary as well as desirable.

"Up in the northwest we found that bankers had not taken the personality of cars and trucks into consideration in extending credit. A heart to heart conference of the bankers with the dealers developed the fact that a motor vehicle has quite a distinctive personality due to its parentage, experience, reputation, intrinsic worth and its standing in the industry. In other words, the credit value of the car must be determined by the company behind the car; the experience of that company in bringing its present model to production; the reputation of the car among automobile users; the material and workmanship apparent in its construction and the industry's valuation on the progressive and permanent policies of the company."

Dealers Must Hold Sales Force

Mr. Clark reports that conditions in the northwest are only fair, with salmon, lumber and wool prices at a low ebb; that California, especially southern California, is enjoying a good normal trade and that business in the mountain states is sound but slow.

Morale-building propaganda is urgently needed at this time, according to Mr. Clark, to enable the dealers to hold their sales organizations during the present period of stress and limited sales. Many of these sales organizations represent considerable capital investment and must be preserved. Scores of bankers interviewed on the trip expressed a willingness to help tide affairs over if the dealers will galvanize sales lethargy into sales energy.

A new schedule of meetings for Mr. Clark and the paintings portraying "The Spirit of Transportation" is being arranged for this fall by the N. A. D. A.

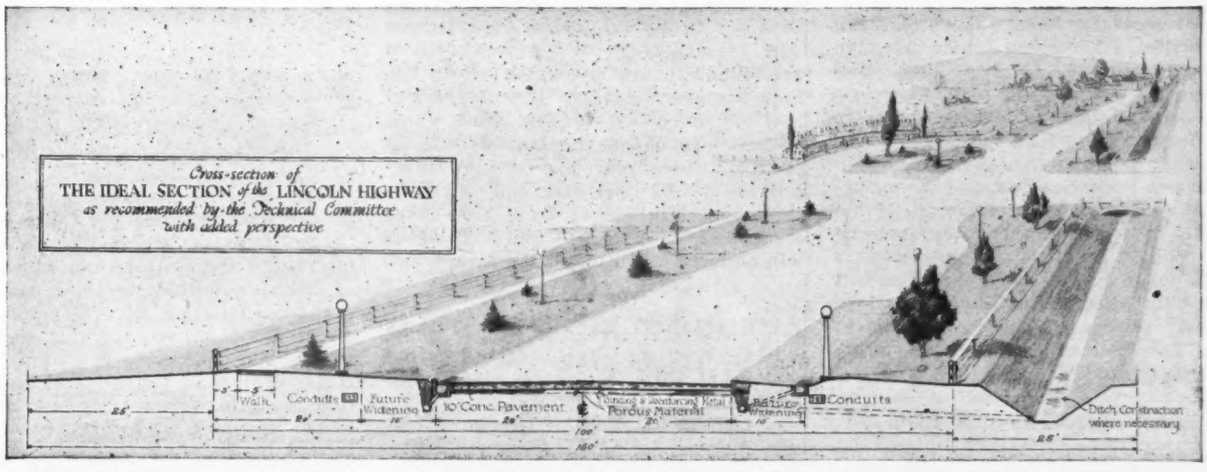
Dealers Claim Heavy Losses In Dodge Brothers Prices

Are Asking Indiana Automotive Association to Take Action in Their Behalf

INDIANAPOLIS, July 1—Many of the Indiana salesmen for the Dodge Brothers car are disgruntled with the action of the company in reducing prices June 8 and are trying to force a meeting of the board of directors of the Indiana Automotive Trade Assn. to take action in their own behalf. The cause of complaint, according to word received here from various state dealers is the fact that reducing the price caused serious money loss to many dealers who had guaranteed prices for the year. These dealers who had guaranteed prices say that about two weeks before the price reduction announcement was made, they sent out letters to prospects and others guaranteeing the price. This was done, they declare, because they were given to understand by the company that there would be no change in prices, when in fact, they allege, the stockholders of the company had voted a month prior to the time the letters were sent out by dealers, to reduce prices.

L. M. Shaw, secretary of the Indiana association, while refusing to discuss the matter, admitted that he had been approached by some of the Dodge Brothers dealers on the subject. According to present plans the state secretary expects to call a meeting of the board of directors some time in September, to make arrangements for a state meeting later in the year, probably in December, but in case the Dodge Brothers dealers are successful in forcing the issue, the board meeting may be advanced. It is said several of the dealers have lost several hundred dollars through price guarantees.

One Engineer's Conception of an Ideal Section of the Lincoln Highway



This illustrates one engineer's conception of an ideal section of the Lincoln Highway. More than a year ago the Lincoln Highway Assn. asked for plans from highway engineers emphasizing ideas for rural road construction. These plans covered the question all the way from dirt roads to the most highly improved paving with all its modern accessories such as lighting, underground wiring, sewers and landscaping. This section of highway is to be built by the association at some centrally located point and will demonstrate a perfection in highway construction to be aimed at rather than to be placed in actual operation

Automobile Dealers Plan to Bridge Golden Gate Bay

California Associations Are Behind Project to Build $25,000,000 Eight Mile Structure

SAN FRANCISCO, July 1—Automobile dealers of San Francisco, Alameda, Contra Costa and other counties of northern California who originated the idea of a bridge across San Francisco Bay, connecting that city with Oakland, and thus with the entire eastern shore of the bay, are meeting with success beyond their strongest hopes.

Every county surrounding the bay has endorsed the project; committees have been appointed to work together to obtain the bridge; the automobile dealers have raised $50,000 to cover expenses of the preliminary surveys and for educational campaigns among the voters, and James Vipond Davies, New York engineer and bridge tunnel expert, and Ralph Modjeski, Chicago bridge engineer, reached San Francisco late in June at the call of the San Francisco Motor Car Dealers' Assn. for conferences with local engineers to outline plans for the structure.

Rough preliminary plans are for a bridge reaching from San Francisco to Goat Island, and thence to Oakland. Its total length would be about eight miles, and the proponents of the plan urge that it be made at least 200 feet wide, in order to care for estimated traffic for the next 20 or 25 years.

The San Francisco Board of Supervisors, the Alameda County and the San Mateo County boards of supervisors, the Berkeley City Council, the Alameda City Council, the Oakland Chamber of Commerce, the San Francisco Real Estate Board, The San Francisco Building Trades Council, the Business League of San Francisco and nearly a score of other active organizations have followed the lead of the Motor Car Dealers' Association of San Francisco and have endorsed the bridge plan.

Local engineers believe the bridge can be built for $25,000,000. Under this plan it would consist of two suspension bridges, hung from the San Francisco and Oakland shores, respectively, to Goat Island. More than 1,000,000 persons live in the territory immediately contiguous to San Francisco Bay, and the motorists of that section form almost, if not quite, a majority of the voting population. Virtually all automobile owners are in favor of the bridge, and the half dozen cities surrounding the bay are loud in their praises of the San Francisco Motor Car Dealers' Assn. for originating the bridge project.

ROAD BUILDERS CUT BIDS

Chicago, July 2—State contracts for 29 miles of concrete roads on the Chicago-St. Louis route have just been let at a marked reduction from the first bids received and refused because they were excessively high. The awards show a drop in the price of cement compared with the bids of last February of 14.4 cents a barrel, or of $476 a mile.

Governor Small, it is said, still considers the bids too high but expresses satisfaction that the figures are well within the $30,000 limit set by his office last winter. One of the bids was as low as $19,722 for a section of road about 15 miles. With the state furnishing the cement for this stretch of road, the cost to the state complete will be about $25,700 a mile.

Dobbin's Ghost Alone to Stalk City Streets

WASHINGTON, D. C., July 2, 1921—The Bureau of the Census, Department of Commerce, announces that 56,539 horses were reported in the city of New York at the census of 1920, as compared with 128,224 reported at the census of 1910. There has been a similar marked decrease in the number of horses in all the principal cities in the United States so far as heard from. Chicago had 30,399 horses in 1920, as compared with 68,122 in 1910; Philadelphia, 19,472 in 1920 and 50,461 in 1910. In Baltimore the number of horses reported at the censuses of 1920 and 1910 was respectively 7,378 and 15,346; in Boston, 10,093 and 23,007; in Pittsburgh, 6,032 and 12,845; in Cincinnati, 5,031 and 13,901; in Cleveland, 4,924 and 16,839.

PLANS 20,000 CARS ON COAST

New York, July 5—A site has been purchased in Oakland for the assembly plant of the Durant Motors of California, which will have a capacity of 20,000 cars a year. Plans for the building have been practically completed. The factory will be similar in design to the main assembling plant on which work has been begun at Lansing. It will be about half the size of the Lansing plant, which will cost $3,000,000 and have a capacity of 40,000 cars a year. The Oakland building will be 600 feet long and will have three wings besides a large storehouse and an administration building which will be located in front of the main plant.

MACK BRANCH FACTORY IN TEXAS

Houston, Tex., July 3—The International Motor Truck Corp. is planning to establish a branch factory here. This was announced when J. George Truelson, formerly of Dallas, was made district southwestern manager for the company. The company is to open this branch factory to take care of business in Mexico and the southwest generally.

Efficient Work of N. A. D. A. Proved In Freight Cases

Saves $415 to One Dealer on Single Shipment; Able and Willing to Serve Others

ST. LOUIS, July 5—Interesting information about the activities of the National Automobile Dealers Assn. in behalf of dealers who have been overcharged on freight, and about the widespread policy of Dodge Bros. dealers with the N. A. D. A. is contained in a letter to Dodge dealers sent out by Harry G. Moock, General Manager of the Association. Mr. Moock says:

"We thought you might like to know something about the 'Dodge Bros. dealer colony' in the National Automobile Dealers Assn.

"Some weeks ago we put the story of the N. A. D. A.'s accomplishments before Chas. W. Matheson, sales manager of Dodge Bros., and we told him also of the general plans for the future of the N. A. D. A. Mr. Matheson was so impressed that he said ALL Dodge Bros. dealers should be in the ranks of the N. A. D. A.

"So he sent some letters to his dealers and now we have 297 Dodge Bros. dealers in the association.

"Just a word, though—in addition to the broad policies for which we are working for the benefit of the whole industry, we do a number of things for the benefit of the individual dealer that he can count on his cash register. For instance, we have a letter this morning from the R. D. Britton Co. (Allen and Velie) at Hartford, Conn. Mr. Britton writes:

Received Check for Damages

" 'We have received check for $140 in payment of our claim for damages to cars. This is in addition to the previous claim you collected for us for overcharge in freight on those same cars, making a total amount which you collected for us on this one shipment of $413.15. We greatly appreciate these splendid results.'

"No automobile merchant is tossing away $500 bills now. Maybe you have some freight bills you suspect of overcharge, or damage claims upon which you can get no action. If so, send them in.

"But what we started out to say was, we certainly welcome you Dodge dealers to the folds of progressive automobile merchants and we take this opportunity of telling you that we think your general sales manager, Mr. Matheson, did a mighty big thing and a mighty necessary one for the industry when he asked all Dodge dealers to get in. And remember that the prime purpose in this automobile industry, whether association, factory or dealer, is that all elements—manufacturer, distributor, dealer, parts maker, service station and repairs—are working together to satisfy first, last and all the time, the customer."

Increasing Sales Feature of June on Pacific Coast

Dealers Attribute Near Approach to Normal Business to Reductions in Price

SAN FRANCISCO, July 1—The rapid recovery of the automotive industry on the Pacific Coast, and the steady return to normalcy were well illustrated in reports here at the end of June. These reports cover the entire state, but San Francisco dealers also declare that approximately the same relative increase holds good for Nevada and Arizona, though not quite so strongly for sales in the states of Washington and Oregon.

The majority of the dealers attribute the steady increase in business since the first of the year, and the marked advance in sales during June to the reduction in prices. In all classes of merchandising, San Francisco is quite generally considered the barometer of conditions prevailing on the Pacific Coast, but Oregon and Washington are being watched closely by manufacturers of the east. P. H. Hine, sales manager for Stevens-Duryea, Inc., spent a week in San Francisco at the end of June, coming west to attend the opening of the F. A. Brinkman agency. Mr. Hine was especially impressed with the interest manifested in closed cars, and predicted a steady increase in sales throughout the year.

Conditions Are Favorable.

Conditions in the automotive industry in the East Bay section—Alameda, Oakland, Emeryville and Berkeley—are reported good by Manager Wert of the Oakland office of R. G. Dun & Co.

Market conditions affecting retail sales of automobiles have fluctuated considerably in the past month. Some cars have had an unusual sale, while others have been slow. At present, sales are a little more active, due to recent price reductions. As a whole, conditions in the retail field are quite satisfactory, and all the dealers seem to hold an optimistic air.

According to agents of the Franklin Automobile Co., sales for the first six days of June exceeded those of the corresponding period in May by more than 100 per cent, this increase following fast on the heels of the cut in prices, announced June 1.

David Aronson, San Francisco Scripps-Booth and H. C. S. dealer, said June sales had exceeded his expectations. "When the new prices were announced," said Mr. Aronson, "I did not expect an immediate increase in sales. I believed that the automobile business would build up gradually with the general return toward normalcy, but instead, the increases came suddenly, beginning almost as soon as the price reductions were announced."

This seems to be the general opinion of the dealers in San Francisco, Alameda, Oakland, Emeryville and Berkeley. Charles H. Kaar, distributor of the Lexington in San Francisco, R. F. Thompson, manager of the Howard Automobile Co., Buick distributors, and half a score of other dealers, attribute the large increase of sales for June in great part to reductions in prices.

A number of firms have been reorganized during the month, and several have moved into new quarters. There seems to be a growing tendency to separate the wholesale from the retail business entirely, and to have different managers for each branch. The latest to do this is the Howard Automobile Co., whose manager, R. F. Thompson, has just promoted Eaton McMillan to salesmanagership, an important post in an organization which claims to sell more automobiles than any other distributing firm in the world. Frank Smith, assistant to Mr. Thompson, as manager, has been carrying the sales manager's job as well as his own, but henceforth Smith will devote his time and energies to the wholesale selling department, while still acting as Thompson's assistant in executive matters.

SALES FORCES MEET

San Francisco, July 1—Two important conferences of coast dealers were held here the last week in June. One was a 100-per cent meeting of all the Nash dealers from northern California and Nevada, called by Harold C. Hart, vice president and general manager of the Pacific Nash Motor Co. Every one of the dealers reported business better than expected in all sections of both states.

The other meeting was the semi-annual sales conference of the Chevrolet Motor Co. of California, which occupied two days. All attaches of the sales department were in attendance, including the managers of all the Chevrolet retail stores in Los Angeles, Oakland and San Francisco.

Quaker City Sales Slow

Philadelphia, July 2—Small and inexpensive automobiles are selling well here now, although there is as much hesitancy in the expensive lines as ever. Trucks are not moving perceptibly in new models, but accessory sales are picking up in spots. Service stations and repair shops are being overworked; which is taken as a sign that general sales are stagnant. Department store methods of display and "special sales" are being employed in both daily and Sunday newspapers in an effort to push passenger car sales. The used car situation is fair.

VELIE LOWERS PRICES

Moline, July 5—The Velie Motors Corp. has made a total maximum reduction in prices of approximately $400 on all models. The new and old prices are as follows:

	Old	New
Model 48—6-cyl. Sedan	$2885	$2485
Model 48—6-cyl. Sport	2200	1800
Model 48—6-cyl. Tour.	1985	1585
Model 48—6-cyl. 7-pass. Tour.	2250	1950
Model 34—6-cyl. Tour.	1585	1385
Model 34—6-cyl. Road.	1585	1385
Model 34—6-cyl. Sedan	2485	2085

Milton Wins Tacoma Race, Sarles Running Second

Winner Drives at the Rate of 98 M.P.H. for Purse of $25,000; Soules Led for 50 Laps

TACOMA, July 4—Before a crowd of 30,000 Tommy Milton, winner of this year's Indianapolis 500-mile race added to his laurels by driving his Durant Special into first place in today's 250-mile race. It was the tenth annual race over this speedway and carried with it a purse of $25,000.

Milton drove the 125 laps in 2:34:15, an average of better than 98 m.p.h.

Roscoe Sarles in a Duesenberg was second. His time was 2:34:52. Joe Thomas in another Duesenberg finished third in 2:38:47. Fourth, fifth and sixth positions went respectively to Hearne in a Revere Special; Alley, Frontenac Special; Miller, Duesenberg. Eddie Pullen and Frank Elliott, in a Duesenberg and Leach Special, were flagged from the course at the 100th lap. Elliott got off to a poor start.

Soules led the field for the 50 laps but was forced out of the race in the lap 61 with piston trouble. Tom Alley came to the pits in his 58th lap for a left rear tire and again in 85th lap. Hearne changed a tire in the 88th lap. In the 98th lap Alley again came to the pits for a right rear tire.

The last 25 laps resulted in a speed duel between Milton and Sarles and reminded the spectators of the great battle these drivers put on between themselves at Indianapolis this year. Milton passed the Duesenberg in the 105th lap. By winning today's race Milton added 500 points to his standing for the year.

The race was refereed by Eddie Rickenbacker. Ray Harroun, winner of the first Indianapolis 500-mile race, acted as pacemaker today, driving a Marmon roadster.

NEW PRICES FOR OLDS

Lansing, July 2—The Olds Motor Works has reduced prices effective at once ranging from $450 to $525 and affecting all models excepting the 6-cylinder cars. The new prices compared with the old are as follows:

	Old	New
4-cyl. Road.	$1445	$1325
4-cyl. Tour.	1445	1345
4-cyl. Coupe	2145	1895
4-cyl. Sedan	2145	2100
6-cyl. Tour., Road.	.....	1450
6-cyl. Coupe	.....	2145
6-cyl. Sedan	.....	2145
8-cyl. Tour. Road.	2100	1725
8-cyl. Coupe	2225	2225
8-cyl. Sedan	2425	2425
8-cyl. Pacemaker	2100	1825
8-cyl. 7-Pass. Tour.	2100	1875
8-cyl. 7-Pass. Sedan	3300	2775

LIBERTY HAS NEW PRICE LIST

Detroit, July 5—The Liberty Motor Car Co. offers reduced prices as compared with September prices as follows:

	Old	New
5-Pass. Tour.	$2050	$1595
Road.	2050	1595
Sport Car	2140	1675
Coupe	2900	2400
Sedan	2950	2495

Recent Price Changes in Current Models

Car	Model	Old	New
Allen	Tour.	1395	1385
	Sedan	2395	2195
American	Sedan	3495	3150
	4-Sport	2595	2350
	7-Tour.	2475	2275
	5-Tour.	2395	2195
	Road.	2395	1195
Beggs	Road. & Tour.	1885	1775
	Coupe	2785	2675
	Sedan	2885	2775
Birch	Road & Tour.	1695	1595
Bour Davis	Road.	2585	2385
	7-Pass.	2585	2385
Brewster	Road.	7900	7000
	Tour.	9000	7000
Briscoe	Tour.	1285	1085
	Road.	1285	1085
	Coupe	1885	1685
	Sedan	1885	1685
	Commercial Del.	1285	1085
Buick	41-47 Road.	1795	1495
	Tour.	1795	1525
	Coupe	2585	2135
	Sedan	2895	2435
Chalmers	Road. & Tour.	1795	1545
	Coupe	2595	2295
	Sedan	2745	2445
Chandler	Road. & Tour.	1930	1785
	Coupe	2930	2785
	Sedan	3030	2885
Chevrolet	490 Road.	795	635
	Tour.	820	645
	Coupe	1325	1185
	Sedan	1375	1195
Cleveland	Road & Tour.	1465	1295
	Coupe	2375	2195
	Sedan	2475	2295
Climber	4-Road.	1550	1450
	4-Tour.	1500	1385
	6-Road.	2750	2250
	6-Tour.	2750	2250
Cole	Road.	3250	2550
	Sportster	3250	2695
	Tourster	3250	2795
	California Sport.	3600	3045
	California Tour.	3600	3145
	Sportcoupe	4250	3695
	Sportsedan	4350	3995
	Sportosine	4450	3995
	Toursedan	4450	3995
	Tourosine	4450	4295
Columbia	Road.	1945	1795
	Tour.	1995	1795
	Coupe	2895	2495
	Sedan	2895	2595
Cunningham	Prices on application		
Dixie Flyer	Tour.	1595	1445
	Coupe	2570	2295
	Sedan	2570	2345
Dodge	Road.	1235	935
	Tour.	1285	985
	Coupe	1900	1585
	Sedan	2150	1785
Dort	Road. & Tour.	1115	985
	Coupe	1685	1535
	Sedan	1835	1685
Elgin	Tour.	1775	1495
	Coupe	2795	2395
	Sedan	2795	2395
Essex	Road.	1595	1445
	Tour.	1595	1445
	Coupe	2100	1950
	Sedan	2450	2300
Ford	Road.	395	370
	Tour.	440	415
	Coupe	745	695
	Sedan	795	760
Franklin	Tour.	2700	2550
	Road.	2800	2650
	Coupe	2950	2850
	Sedan	3850	3650
Gardner	Road. & Tour.	1195	995
Handley-Knight	7-Tour.	2985	2850
Hudson	Tour.	2400	2250
	Coupe	3275	3125
	Sedan	3400	3250
Hupmobile	Road. & Tour.	1685	1485
	Coupe	2725	2400
	Sedan	2800	2485
Jordan	M Road.	2650	2250
	Tour.	2650	2250
	Coupe	3700	3300
	Sedan	3700	3300
Kissel	Coupe	3875	3375
	Sedan	3875	3375
Lafayette	Road. & Tour.	5625	4850
	Coupe	7200	6250
	Sedan	7400	6500
Lexington	"S" Tour.	2285	1885
	"S" Thorobred	2285	1985
	"S" Lex-Sedan	2785	2185
	"S" Coupe	3250	2750
	"S" Sedan	3350	3150
	"T" Tour.	2985	2785
	"T" Sedanette	4150	3750
Liberty	5-pass. Tour.	2050	1595
	Road.	2050	1595
	Sport Car	2140	1675
	Coupe	2900	2400
	Sedan	2950	2495
Lincoln	Road.	4600	4300
	Tour.	4600	4300
	Coupe	5750	4950
	Sedan	6000	5400
Marmon	Tour.	5000	3985
	Town car	6800	5400
	Coupe	6150	4875
	Sedan	6600	5275
Maxwell	Tour.	995	845
	Coupe	1595	1445
	Sedan	1695	1545
Mitchell	Road. & Tour.	1750	1490
	Coupe	2800	2590
	Sedan	2900	2690
Monroe	Tour.	1440	1295
	Coupe	2400	2075
	Sedan	2500	2175
Nash Six	5-Tour.	1695	1545
	7-Tour.	1875	1695
	7-Sedan	2895	2695
	4-Coupe	2650	2395
	2-Road.	1695	1525
	4-Sport	1850	1695
Nash Four	5-Tour.	1395	1195
	2-Road.	1395	1175
	3-Coupe	1985	1735
	4-Sedan	2185	1935
National	7-Tour.	3750	2990
	4-Phaeton	3750	2990
	2-Road.	3750	2990
	4-Coupe	4900	3990
	7-Sedan	4950	3990
Norwalk	Tour.	1285	1135
Oakland	Road. & Tour.	1395	1145
	Coupe	2065	1815
	Sedan	2065	1815
Oldsmobile	4-cyl. Road.	1445	1325
	4-cyl. Tour.	1445	1345
	4-cyl. Coupe	2145	1895
	4-cyl. Sedan	2145	2100
	6-cyl. Tour. Road.	.....	1450
	6-cyl. Coupe	.....	2145
	6-cyl. Sedan	.....	2145
	8-cyl. Tour. Road.	2100	.....
	8-cyl. Coupe	2225	2225
	8-cyl. Sedan	2425	2425
	8-cyl. Pacemaker	2100	1825
	8-cyl. 7-pass. Tour.	2100	1875
	8-cyl. 7-pass. Sedan	3300	2775
Overland	Road. & Tour.	895	695
	Coupe	1425	1000
	Sedan	1475	1275
Paige	6-66 Tour.	2895	2875
	Coupe	3775	3755
	Sedan	3850	3830
Piedmont	4-30 Tour.	1395	1270
	6-40 Tour.	1795	1495
Pilot	Tour.	2285	.....
	Coupe	3600	3350
	Sedan	3600	3400
Premier	4-Tour.	4600	3690
	7-Sedan	6000	5090
	7-Tour.	4600	3890
	7-Sedan	6100	5190
	Coupe	5600	4690
	4-Artcraft Top	5000	4090
	7-Artcraft Top	5000	4290
Raleigh	Road. & Tour.	2750	2250
	Coupe	3600	3100
	Sedan	3700	3200
Saxon	Tour.	1675	1495
	Coupe	2475	2295
	Sedan	2475	2295
Scripps-Booth	Road.	1545	1275
	Tour.	1545	1295
	Coupe	2215	1950
	Sedan	2295	2100
Seneca	Road.	1185	1045
	Tour.	1185	1045
Sheridan	Road. & Tour.	1685	1485
	Coupe	2565	2265
	Sedan	2765	2465
Stanley Steamer	5-Phaeton	4200	2900
	7-Tour.	4200	2900
	Coupe	5950	4100
	Sedan	6100	4250
Stephens	92 road	2400	1900
	B-92 Road., Sport.	2600	2000
	94-B-94 4-Pass. Tour.	2400	1985
	94-A 4-Pass. Tour. Sport	2600	2085
	96 6-Pass. Tour.	2400	2065
	93 4-Pass. Sedan	3400	3100
	95 7-Pass. Sedan	3400	3100
Studebaker EH-50	Road. & Tour.	1750	1585
			1635
	Coupe	2650	2450
	Sedan	2750	2550
Stutz	4-pass. tour.	4000	3350
	6-pass. tour.	4000	3350
	Road.	3900	3250
	Bearcat	3900	3250
Templar	Road.	2885	2385
	Tour.	2885	2385
	Coupe	3785	3185
	Sedan	3785	3185
Velie	Model 48 6-cyl. Sedan	2885	2485
	Model 48 6-cyl. Sport	2200	1800
	Model 48 6-cyl. Tour.	1985	1585
	Model 48 6-cyl. 7-Tour.	2250	1950
	Model 34 6-cyl. Tour.	1585	1385
	Model 34 6-cyl. Road.	1585	1385
	Model 34 6-cyl. Sedan	2485	2085
Wasp	Tour.	6500	5500
Willys-Knight	Road.	2195	1895
	Tour.	2195	1895
	Coupe	2845	2550
	Sedan	2945	2750

Chicago District Sales Reach High Level

Chicago, July 5—In all lines of cars which have been subjected to reduced prices there was a very decided improvement in sales for the month of June as compared with May and April. In many cases reports are to the effect that record sales are the result of June efforts. Figures for these statements are not available, but the bare statement of the dealers is almost proof that these conditions prevail. A short time ago these same dealers were reporting little if any business. Automobile row in Chicago appears to be busier than ever before, the atmosphere seems to have undergone a magic change; dealers have taken a new hold, with the assurance that sales are going to keep up to a high level during July.

The heaviest movement in cars is in from low to medium priced lines. A few high-priced makes are moving slowly, but even in these rare spots business is reported better than was expected.

The sale of used cars has had a decided set-back within the last two weeks. There is hardly a noticeable movement in trucks, excepting for brisk inquiries for the reimported machines. Sales in this class are not record-breaking by any means. The tire business continues good and sales in accessories are improving rapidly.

NEW OFFICIALS IN ST. LOUIS

St. Louis, July 5—The St. Louis Motor Trade Assn.'s newly installed officers are: G. G. Giese, Elastic Tire Cushion Co., president; E. A. Kantsteiner, Sligo Iron Store Co., vice president; A. R. Baxter, treasurer, and Robert E. Lee, secretary of the Automobile Dealers' and Manufacturers' Assn., secretary.

FOUR MORE JOIN M. T. M. A.

Chicago, July 1—The Atterbury Motor Car Co., Buffalo; the Federal Motor Truck Co., Detroit; the Selden Truck Co., Rochester, and the Stewart Motor Corp., Buffalo, recently have become members of the Motor Truck Manufacturers' Association with headquarters in this city.

Orders Prevent Close-Downs

Factories Prepared to Close July 1 Have Changed Plans and Are Now Running on Schedules Below Normal

DETROIT, July 5—Decision to close theTimken Detroit factory for a month July 1 has been altered as the result of orders coming in steadily which will necessitate operation of the plant on the present basis of one-third normal for the next 60 days at least, according to General Manager Fred Glover. Orders are coming through every day, said Mr. Glover, and though in small volume are sufficient to keep the factory working.

The same is true of Continental Motors, which, although no definite closing date had been fixed, had anticipated a slowing up around July 1 with a possible temporary shutdown. Vice-President G. W. Yeoman said the plant would continue to operate on the present basis and all indications point to a steady demand. Mr. Yeoman reiterated his statement that the company would operate just as long as compelled to by incoming orders and from time to time might shut down for two or three-day periods, though no general closing down was anticipated.

The same attitude is apparent at the Hupp Motor Car Corp. plant. Hupp has been building 80 cars a day, basing production strictly upon sales demand, and it is the intention of Hupp executives to close down for short periods from time to time as the market fluctuates. However, President Hastings said demand is brisk and there is no indication that the plant will have to slow up.

Employment figures for last week in 79 factories in Detroit show 559 less men at work than during the week previous. The total employed was 109,621 in the 79 factories which includes practically all the automobile plants. Short time schedules were in force in 25 concerns which were working 6,391 men on an average of 21¼ hours weekly. The figures are for the week of June 21.

Up state concerns appear to be in good shape as far as production is concerned due to the stimulation in sales as a result of the price cuts. This is true particularly of the **Wilson Foundry & Machine Co.,** at Pontiac. Orders bringing production close to the maximum of last year are reported by D. R. Wilson, general manager, who declared a part of the new plant has been put into use to meet the production. "We passed the 1,000 mark on the payroll last week," said Mr. Wilson, "and we are so busy trying to keep up to the demands of the Overland plant that we expect to be compelled to work a Sunday shift.

Rush of business at the Willys-Overland plant is keeping up, and reserve orders have grown to such an extent, the plant is assured of its schedule through August. We have orders to turn out 550 jobs a day and that number are going through the shop. The Overland plant, however, will use that number so we have little chance of getting ahead of it. This will necessitate our working on Sunday. We have been summoning former employees wherever it was possible to locate them and the total number on the payroll has been substantially increased within the last two weeks."

J u l y Production 50 Per Cent Over May

WILLYS-OVERLAND CO. will increase its July production 50 per cent over that for June, setting the output at 12,000 cars as a minimum. It is announced at the plant that production will be speeded up to surpass this by several hundred cars, if it is mechanically possible.

Production of Model 4 and Willys-Knight cars actually completed or scheduled for June and July is already sold. Sales from May 16 to June 15 aggregated 18,000 cars. Actual deliveries the first two weeks of June exceeded 6,500 machines.

TO INCREASE FORCE TO 6,000

Detroit, July 1—Central Products Division of General Motors Corp. contemplates doubling its working force in Detroit within the next 30 days. From 2,000 to 2,500 men are employed at present by that unit and this number will be increased to at least 4,000 in the next month. Within five months the new plant of the Central Products Co. will be completed and the working force increased to about 6,000.

The Central Products Division includes the Central Axle Co., the Central Gear Co. and the Central Storage Co. The new factory in process of construction is the Central Motor Co., also a part of General Motors.

It is said that at the end of 10 months it will be necessaary to put on night shifts increasing the corporation's working force in the Central Products Division to 9,000.

IOWA SALES IMPROVE IN JUNE

Des Moines, July 5—After four days' survey of business conditions in southeaster Iowa, H. J. Lytle and A. J. Knapp, president and secretary, respectively, of the Iowa Motor Trades bureau, report that the past month has seen a decided improvement in conditions among the motor car dealers of that section of the state. The two bureau officials held dealer meetings in Centerville, Albia, Ottumwa, Fairfield and Burlington, and spent their days in interviewing individual dealers.

Dealers in all of the above towns report that there has been a decided upturn, only a part of which is attributed to price reductions. In the main, however, the improvement has not extended to sales among farmers, as the farmer has not as yet returned to the market. During the past month prices of grain have shown an appreciable gain and it is thought that if this continues it will result favorably on farmer sales.

The optimistic dealer reports tally with the personal experiences of Mr. Lytle, whose firm, the Burlington-Overland Co., is a large distributor in that section of the state. Up to June 25, the business of the Burlington-Overland Co. has surpassed any June business during the past five years.

Pike's Peak Hill Climbing Contest Set for Sept. 5

Colorado Springs, July 2—The third annual Pike's Peak hill climbing contest will be held Sept. 5, with the sanction of the A. A. A., and is open to all cars. To the car making the best time, regardless of class or event in which it is entered, goes the Penrose trophy, for one year, and $500 in cash. Cash prizes for the contest total $2,100.

Concerning Men You Know

John N. Willys has accepted the appointment on a committee which will organize throughout the country branches of the "Sell Now League." The purpose of the organization is to stabilize economic conditions by selling now in selected markets. Willys believes such a campaign is absolutely necessary to hasten the return of normal conditions.

Harry H. Anderson has been appointed general sales manager for the Duesenberg Automobile & Motors Co., Inc., of Indianapolis.

Earl B. Spencer, for many years with the Pierce-Arrow Co., has become connected with the Leach Biltwell Motor Car Company of Los Angeles, as production superintendent.

W. C. Durant and the headquarters organization of Durant Motors, Inc., is now settled in its permanent location on the 11th floor of the new Gotham National Bank Building, at Broadway and 59th street.

A. W. L. Gilpin, manager of the Milwaukee assembling plant and branch office of the Ford Motor Co. since its establishment, has been promoted to the post of district manager in charge of branches at Chicago, Milwaukee, Indianapolis, Cleveland, Cincinnati, Louisville, Columbus and Detroit. He is succeeded as Milwaukee manager by A. B. Pease, who has been Mr. Gilpin's assistant for several years.

John A. Cleary, advertising manager of the Cadillac, has resigned to accept the same position with N. H. Collins. Cleary has been with the Cadillac organization several years, having been sales promotion manager for the Cadillac distributor in Philadelphia prior to his factory connection.

A. L. Jones has been named president of the Revere corporation, a company organized among the stockholders of the Revere Motor Car Corp., of Logansport, for the purpose of purchasing the property of the concern. A. A. Segraves was elected vice-president and Edward Kelly, secretary-treasurer.

John J. Plath has been made director of sales of the Maxwell Motor Sales Corp. and E. W. Clark director of sales of the Chalmers Motor Car Corp.

Harry Gardner has retired as manager of passenger car sales for the Packard Motor Car Co. He has not decided upon his plans for the future. Gardner formerly was secretary of the New York Automobile Dealers Assn.

A. R. Heiskell and H. G. Shafer are the two new vice-presidents of the Nordyke-Marmon Co. H. L. Purdy, formerly assistant treasurer, fills Mr. Heiskell's former position as treasurer; H. H. Rice, formerly sales manager, becomes secretary of the company in Mr. Shafer's place. H. H. Brooks is now sales manager, and A. J. Rogers, advertising manager, takes his former place of assistant sales manager.

John Nicol, veteran Chicago distributor for Federal trucks has left the truck business and is now distributor for the Saxon Duplex in this territory.

F. R. Robinson, secretary of the Packard Motor Car Co., Detroit, also has assumed the duties of treasurer. Mr. Robinson, the new secretary-treasurer has been in the Packard organization 12 years, holding successively the positions of auditor, comptroller and secretary.

New York Sales for June Show Healthy Increases

New York, July 5—June closed with both retail and wholesale sales of passenger cars in the New York territory running strong. Several medium-priced cars have run far ahead of their April and May records and a large number of cars which were not selling at all in April and May, because they had not yet reduced prices, have had brisk sales, with the result that the total of June sales and deliveries will be the largest for the year.

Despite persistent rain, sales did not show any decided falling off as the month was drawn to a close and there has been no indication of any July and August slackness beyond that which is normal when large numbers of automobile-owning people are away on their vacations.

Buick has closed its June books with the second largest month in the history of the New York branch. The record month was in 1918, but it exceeded the business of the past 30 days by only a few cars. Franklin's June was better than 1920. Oldsmobile exceeded its May record and almost equalled the heavy sales of April, business in the territory outside New York City being especially good. Maxwell's sales curve has climbed steadily through April, May and June. There are a few cars which have not sold well and several of the high priced makes have had some slowing up, as compared with their April and early May records.

COLE REDUCES $455 TO $700

Indianapolis, July 5—Various models of the Cole Aero-Eight have been reduced from $455 to $700. The new prices compared with the old are as follows:

	Old	New
Road.	$3250	$2550
Sportster	3250	2695
Tourster	3250	2795
California Sport	3600	3045
California Tour.	3600	3145
Sportcoupe	4250	3695
Sportsedan	4350	3995
Sportosine	4450	3995
Toursedan	4450	3995
Tourosine	4450	4295

DENBY NAMES NEW PRICES

Detroit, July 1—The following reduced prices on Denby trucks effective July 1 are as follows:

	Old	New
¾- and 1-ton	$.....	$1625
1½-ton	.....	2300
2-ton	2800	2600
3-ton	3600	3300
4-ton	4600	4200
5-ton	5350	4850
7-ton	6200	5500

FIAT SCRATCHES LE MANS RACE

Paris, June 29—Fiat will not start in the French Grand Prix race at Le Mans on July 25. This decision has been taken by the leading Italian firm after having paid entry fees amounting to £7,100, but without any explanation being given as to the reason for the withdrawal. The Grand Prix cars have been on the road for some time and new eight cylinder engines have been built and tested with, it is declared, very good results.

In consequence of Fiat's withdrawal, Louis Wagner has signed a contract to race for Ballot in the Grand Prix, his team mates being Ralph De Palma, Chassagne and Goux. Minoia has also left the Fiat team, and it is believed that his place will be taken by Felice Nazzaro.

Competitors in the French race are now reduced to 16, as follows: 4 Duesenberg, 4 Ballots, 2 Sunbeam, 3 Talbot-Darracq, 2 Talbot, and 1 Mathis. Ralph De Palma is already practicing with his car. Joe Boyer is in Paris waiting for his Duesenberg, which is expected to arrive by an early steamer.

Packard Twin Six Models Reduced $1150; Trucks Lower

Detroit, July 1—The Packard Motor Car Co. has reduced prices on all its twin six models, closed models in single six and on trucks. Twin six open models are reduced $1150, or about 19 per cent and other twin six models are reduced the same percentage. The single six sedan carries a reduction of $400 and the coupe $275. New truck prices are: Model EC $3500; model ED $4100; EF $4500 and EX$4000.

TRY CO-OPERATIVE PLAN

Indianapolis, July 1—The Howard County Automotive Trade Ass'n is trying out the co-operative plan in selling used cars. Three days last week all the used cars held by dealers in the organization were taken to a central location in Kokomo and put on display, with one man from each office in charge. The public seemed to like the idea and instead of shopping around the various salesrooms, was able to look the cars over at once. Special lights were used at nights. The machines were parked under a large tent.

PRICES OF PREMIER LOWER

Indianapolis, July 2—At the expiration of its guarantee against a decrease in prices, July 1, the Premier Motor Corp., made known price reductions, ranging from $710 to $910. The new prices are as follows:

	Old	New
4-pass. tour.	$4600	$3600
4-pass. sedan	6000	5090
7-pass. tour.	4600	2890
7-pass. sedan	6100	5190
Coupe	5600	4690
4-pass. artcraft top	5000	4090
7-pass. artcraft top	5000	4290

NEW PRICE ON HANDLEY

Kalamazoo, July 2—The Handley Knight Co. has reduced the price of its seven passenger touring car from $2985 to $2850 making a total reduction of $500 since last November. Prices of the sedan and de luxe models remain unchanged. The company notified its distributors on June 1 that prices which prevailed then would be guaranteed up to January 1.

LIBERTY LOWERS PRICES

Detroit, July 1—The Liberty Motor Car Co. announces price reductions on all models effective today. The touring car and roadster are reduced from $1795 to $1595; the sport model from $1985 to $1675; the coupe from $2825 to $2400; and the sedan from $2850 to $2495.

Better Business
Money-making Ideas

A dollar will be paid for all ideas accepted as Better Business—Perhaps you have some.

Novel Method Sells Speedometers

A dealer in accessories has a novel method of interesting customers in his speedometers. The city in which he does business is noted for its rigid traffic requirements, the enforcement of the ordinance against speeding being particularly rigid. One of the dealers' salesmen rides a motorcycle about the city on the lookout for motorists who are exceeding the speed limit. Whenever one is noted, the salesman gives chase and stops him. The driver usually mistakes the salesman for a motorcycle officer and answers questions as to his address, etc. A few days later a letter is sent to the driver of the car explaining the need of a speedometer, stating that it is impossible for the driver to tell whether or not he is exceeding the speed limit unless his car is so equipped. The dealer says that many sales are made by this method.

Applied Psychology Brings Results

As the trading instinct is very strong in every man this fact can be utilized by the dealer in working up deals among people who patronize his service department. Whenever the owner of a rather old car comes into the shop the dealer might approach him like this: "What would you take for that car? I think I know a man who wants a car just like that." In most instances the owner would put a price on the car and from this point it would be an easy matter to lead the owner into the frame of mind where he would be willing to consider a deal for a new car.

Repairs Battery Before Customer

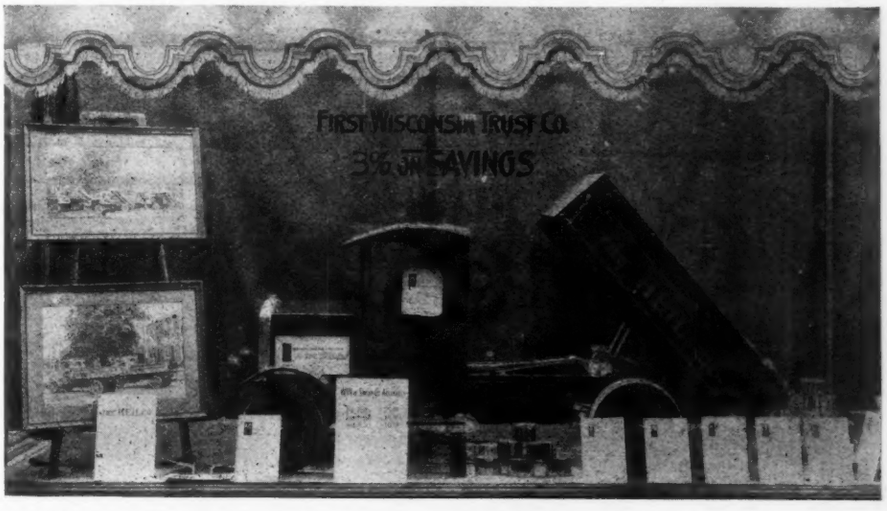
Oliver A. Pope, M. E., proprietor of the Pope Battery Co., Hartford, Conn., knowing that the average automobile owner likes to be shown just wherein his battery has gone wrong, rigged up a port-instrument stand. When a customer comes in for a battery inspection Pope wheels the stand up to the car, or if the owner would rather see the test conducted on the bench the battery is removed.

Pope makes his contacts in the presence of the owner and explains just wherein the battery is below normal. Then he gives his opinion as to what is the trouble, and with the customer's permission opens the faulty cell or cells in his presence. This method has proved very acceptable to car owners and has had the good effect of increasing business.

Don't Overlook This Prospect

Every son of a successful man is a prospect for the car dealer provided that son is of age and is in business for himself. The sons of successful men, as a rule, purchase cars much more quickly, after entering business, than do the sons of unsuccessful men, so it would be a good policy for the dealer to get in touch with the sons of successful men just as early as possible.

Window Display Creates Wide Interest



A WINDOW display which created widespread interest was the result of the cooperation of the Heil Co., Milwaukee, Wis., and the First Wisconsin Trust Co. The Bank, with a view to increasing its saving accounts, donated its window, and the Heil Co. installed a miniature dump truck with the hoist operated by an electric motor which was placed under the hood. The body was filled with stage money, and pamphlets calling attention to the special features of the hoist operation, were placed along the window.

Directly in front of the truck was a card reading, "Win a Savings Account," with prizes of from $10 to $25 offered for the best 250 word essay on the advantages of the Heil Hydro Hoist over other motor dumping equipment. The hoist was operated nearly every two minutes, with the result that large crowds surrounded the window at all times.

Both the bank and the Heil Co. assert that this was one of the most successful window displays either ever had. Besides aiding in popularizing the bank as well as the truck, and being written up in several banking journals, it led to the receipt of a large number of letters containing clever ideas concerning the Heil hoist.

Automotive Architecture

Planning & Building Problems

Conducted by Tom Wilder

Make the Layout Fit the Lot

WE are planning to erect a garage 75 by 150 ft. and would like your assistance in the layout. We are at present working four mechanics and carrying about $5000 worth of Buick and Dodge parts and have about the same amount invested in tires and accessories. We expect to have a showroom to accommodate not less than two, and possibly three cars, and want as much storage space as we can possibly arrange for. The shop should be able to take care of two or three cars at one time.—T. E. Boyd, El Paso, Ill.

The layout in your sketch does not work out very well for a lot of the proportions you have, it being better suited to a lot 100 to 120 ft. deep.

A space 50 to 55 ft. wide is best for garage purposes, so we suggest you use the back side for nearly its whole length as the garage and confine all the other departments to the 25 ft. strip that remains. The shop is the only room that would be improved by being wider but you can do very well with the 25 ft. space, though it would be possible to widen it a little as shown by the line A, using the storage space back of this line for short cars only.

If this arrangement is used, it would be best to extend the aisle straight through, making the exit to the alley instead of the side street.

One big advantage of the arrangement we suggest is that the whole street front, with the exception of the shop frontage, on both sides could serve for display.

The balcony, probably for general office use is placed where it will be above the accessory store and private offices rather than the car showroom. It is better to have the effect of the high ceiling where the cars are so that they will not appear so crowded.

A Two-Story Paintshop

PLAN 347

Kindly give us the benefit of your advice in building a two-story shop suitable for automobile painting and trimming. We would like to have the varnish rubbing deck and trimming department on the first floor and color varnish and finishing on second floor with an elevator in front end of shop. We want to eliminate all posts on the second floor and arrange for a maximum amount of light. Half of the upper floor will be partitioned off for a finishing room. This will be in the rear of the building with overhead skylight and proper ventilation. The paint stockroom will be located in the front end of the upper story.

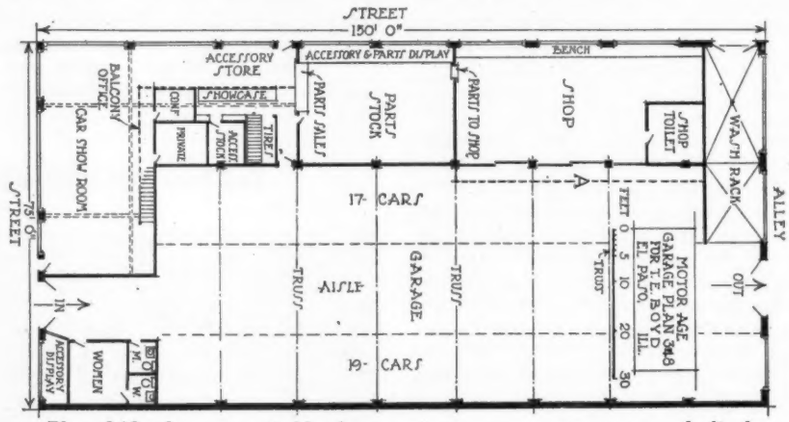
Could 50 ft. girders be used in place of posts on the first floor without too much expense? Is the sash construction such as the Ford and Dodge use in Detroit cheaper than the old way of building with single sash? We prefer the steel sash owing to the lighting effect. The office will be located on the first floor on Richmond street. The second floor will be concrete.—Cut-Rate Auto Paint Shop, 557 Mission Road, Los Angeles.

Fifty foot buildings are often erected without posts to support the second floor but they are usually of mill construction rather than concrete. Concrete in itself is so heavy and puts such an added load on the girders that they must be of extremely heavy construction. Of course, it can be done, but we would advise using built-up girders which will be 2½ or 3 ft. deep with brackets to carry ordinary floor joists, or if you prefer, small timbers placed about 3 ft. apart on centers, the latter to carry the plank floor.

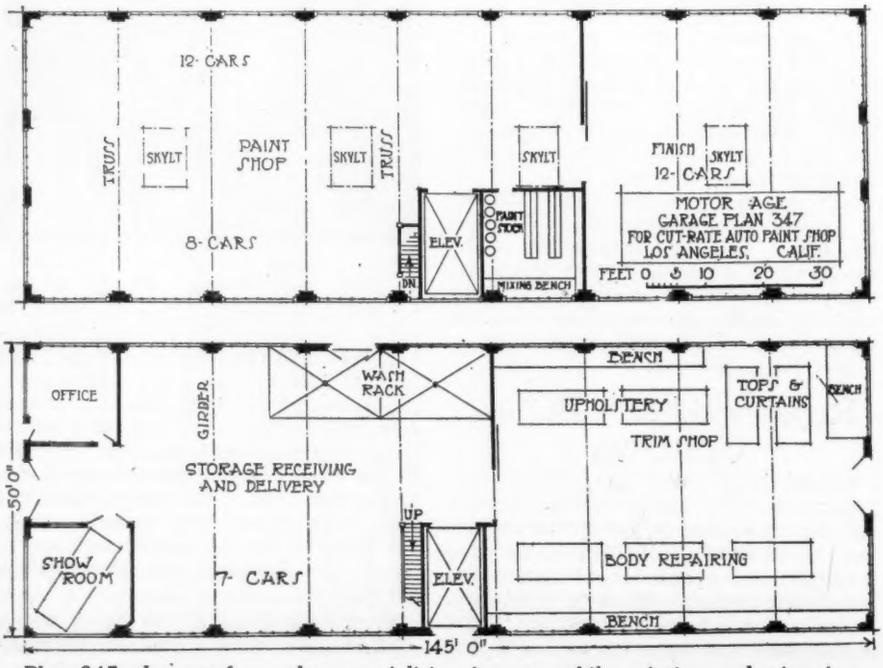
The steel sash makers claim their product (stock sizes only) is cheaper than wood sash and it is certainly to be desired even though it should cost more.

We have laid out a plan to suit the girder construction but if you should decide to use posts instead, the spacing would be about right for a paintshop but would be wasteful of space for regular garage storage. In the latter case, the posts should be either 14 ft. on centers or 21 ft., the cars needing no working space between.

We suggest using the corner space on the first floor as a show window to display your latest completed job, moving the office to the inside front corner. If the space will permit, we think all the paint and finishing operations could be done on the second floor.



Plan 348—Layout suitable for a garage, accessory store and display room



Plan 347—Layout for a shop specializing in automobile painting and trimming

Planning Floor Space for Best Results

PLAN 350

Q—We are contemplating erecting a new building in a few weeks and are somewhat at a loss how to plan the floor space to obtain the best results. We will appreciate your advice. Our lot is a corner 66 ft. by 75 ft., paved street on the 66 feet side. (Both streets 66 ft. wide.) Our idea is to use the corner for drive in gasoline filling station with two runways on each side of the gasoline pump. Want space for battery room where one or two cars can be handled at one time, also space for office and stockroom for we intend to handle tires, spotlights and similar automobile accessories. If space will permit we want room for storage.—Eustis Storage Battery Co., Eustis, Fla.

The corner filling station cuts rather seriously into your space, occupying almost a quarter of it. This space is about as small as practical, however, as if the runways are shorter the cars would project over the sidewalks and interfere with pedestrians.

Avoid Using Unpaved Street

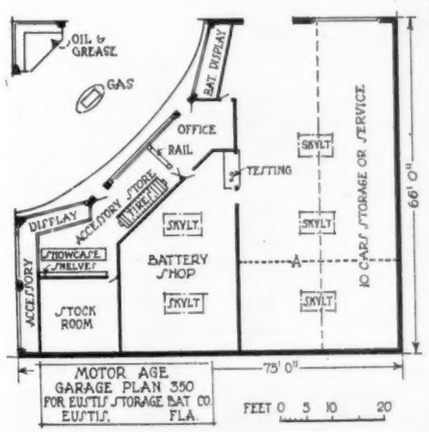
We might have made the entrance to the battery department through the filling station to avoid using the unpaved street, but that is bad practice as gas customers often block the entrance so that battery customers have to wait and since the departments have nothing in common it is better that they be entirely separated.

We have placed the accessory display windows across the paved street side where they will be seen by the majority of the passers. The office is centrally located so that it is handy to the accessory store, the battery shop, the garage and the filling station, all four departments opening directly into it. The stock room is also easily reached from the shop either direct or through the store as may be desired.

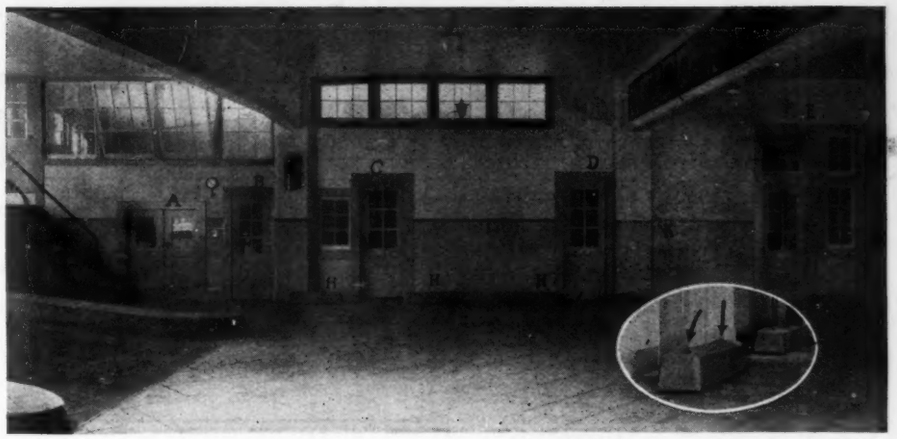
Run Partition Across

The garage is large enough to hold 10 cars which may be either in storage or receiving battery service.

If the battery shop is too small the end of the garage may be included by running a partition across at A, this being a question of giving the space to the shop or the garage.



Plan 350—Suitable for filling station, accessory and repair departments



Portable Concrete Bumpers Prove Effective

A NOVEL feature of the garage illustrated is the use of portable concrete bumpers (H) weighing 300 lbs. each which can be moved for use to any part of the garage which would not be the case if they were a permanent part of the floor. Each bumper has two eyes, shown at the arrows, to which may be attached a rope or chain, for the purpose of dragging them from place to place as needed.

These are a safety feature effectively preventing collision of cars and preventing careless drivers from backing too far. Notice the drinking fountain along the wall at K. There are also concrete ridges on each side of the driveway at the left.

The illustration shows how space under a ramp has been utilized to good advantage. A stairway leads from the garage proper to the ramp, which extends toward the right behind the partition giving easy access to the second floor. The two doors at A open into a concrete oil room. Here are located the gas meter, barrels of oil, and oil wagons.

Under the floor there is a steel tank for storing gasoline. By placing the oil here a fire hazard has been eliminated. This also adds to the neatness of the garage. The door at B leads into a cozy telephone booth with a seat where customers may call their numbers, and carry on conversation unmolested by any noise from the garage.

The door at C leads into a beautifully appointed rest room for ladies. A similar rest and smoking room is provided for gentlemen at D. The doors at E leads into specially equipped rooms for the employes of the garage. There is a steel locker for each employe on this floor, hot and cold water for washing, and a large table with chairs which is provided for the men so that they may have a clean place to eat their noon lunch. Papers and magazines are provided for the employes.

Making the Garage Ceiling Attractive

It is so seldom that we see a garage with anything but open trusses and exposed rafters that the above photograph of the Randall Dodd Automobile Co. garage, Salt Lake City, is something of a novelty. Ceiling joists have evidently been hung to the underside of the trusses and lath and plaster applied. The result is a clean white ceiling of much neater appearance than usual. It also has the advantage of being a conservator of fuel, the room being much more easily heated on account of the dead air space between the ceiling and roof. The impervious nature of the plaster also keeps the heat in and cold air currents out

The Readers' Clearing House
Questions & Answers

Well Designed Electrical Test Bench

Q—Publish diagram showing the best way to construct a test bench for electrical equipment. Can you furnish a working plan or tell where same may be obtained?—Guy L. Chase, Dwight, Ill.

The bench illustrated was designed and patented by the Auto Electric Repair Co., 1336 Michigan Ace., Chicago, working in conjunction with C. W. Morgan and was especially constructed for purposes of instruction at the vocational schools of the United States War Department at Camp Grant, Ill. All storage battery wiring, though actually concealed, is shown in diagram on the front of the switchboard and top of the bench. The action of all switches as well as circuits can therefore be studied with ease. Two separate 110 volt d. c. motors furnish the power for driving generators and magnetos separately and both motors are wired to run in either direction and at any speed from the maximum speed of the motor to full stop, the speed control feature being obtained through carbon rheostats. The complete wiring of these motors is shown in a blueprint on the switchboard though not shown in the accompanying illustration.

The switchboard is equipped with 6 and 12 volt relays, ammeters, voltmeters, etc., and the wiring is arranged to permit six different types of tests being conducted, using batteries, without interference, regardless of whether 6 or 12 volts are required in these different tests.

The bench is further equipped with a portable spark plug tester, for determining electrical defects under compression, or for testing magnetos under compression, a portable, adjustable open air spark gap also for testing magnetos, a 110 volt d. c. magnetizer, a 110 volt a. c. growler, a test lamp for determining defects in armatures and an undercutter for undercutting the insulation of commutators.

CONDUCTED BY WM. H. HUNT
Technical Editor, Motor Age

The Readers' Clearing House

THIS department is conducted to assist Dealers, Service Stations, Garagemen and their Mechanics in the solution of their repair and service problems.

In addressing this department readers are requested to give the firm name and address. Also state whether a permanent file of MOTOR AGE is kept, for many times inquiries of an identical nature have been asked by someone else and these are answered by reference to previous issues. MOTOR AGE reserves the right to answer the query by personal letter or through these columns.

TESTING AND REPAIRING FORD MAGNETO FIELD COILS

Q—A few of the magneto coils of a Ford engine have had the insulation partly broken off and the coil winding is exposed in places. Is this apt to cause trouble if not repaired?

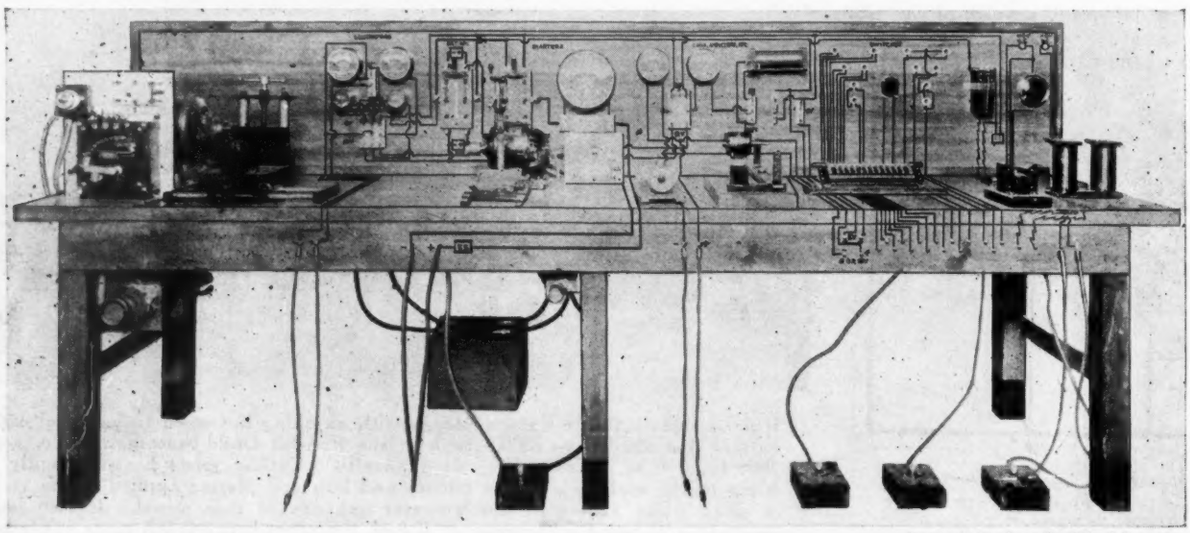
2—What is the best way to repair the broken insulation of these coils? Can shellac be used? What does the Ford Co. use to insulate them with?

3—In testing the strength of the Ford magnets it is claimed that each magnet should be able to hold a steel block 1⅝ in. square by 3 9/16 in. long which is said to be equal to the weight of a Ford camshaft gear.

4—By calculation, using .283 pounds as the weight per cu. in. of steel, I find that a bar 1⅝ in. square by 3 9/16 in. weighs less than two pounds, while the camshaft gear weighs approximately 2⅝ pounds. Is a Ford magnet considered good if it will suspend a weight of two pounds? What is the least weight that a Ford magnet can support and still be considered fit to use?—Everett L. Fredeen, Taylor Falls, Minn.

1 & 2—If the insulation is broken from the Ford magneto field coils it is better to replace them as the oil working into them will dissolve the parafine paper insulation between the turns. A makeshift repair can be made by carefully cleaning and drying the breaks and coating them with three of four coats of shellac. This is a doubtful expedient which is not guaranteed to be permanently satisfactory.

3 & 4—We have no definite figures on how much weight a coil will support. It will depend greatly on how much current is passed through it. However, with the current from a 6-volt battery passing we should say that it should support more than two pounds. There are two methods of testing these windings for short circuits. One is to pass a battery current through the complete assembly and note the comparative pull of the



Copyright by C. W. Morgan.

Fig. 1—Very complete automotive electrical test bench on which any unit of the electrical system may be tested. The wiring, though actually concealed, is shown in the diagram

cores. The other is to disconnect the cores one from the other all the way around and test each separately with a battery current noting the comparative pull. In both of these tests the assembly must be removed from the car. The reason for this is obvious in the second test. In the first it is that if it is attempted with the permanent magnets in place they are almost certain to be demagnetized.

A CASE OF REVERSED POLARITY

Q—Advise which pole has to be connected to the generator on the Ford car, whether the positive or negative. It appears that in the original design all the positive terminals of the battery are connected to the positive terminals of the generator, but, on the contrary, mine is reversed, though it has been working satisfactorily for over a year.—J. Prat, Jr., Monterrey, N. L., Mexico.

Referring to Fig. 2 it will be seen that when originally installed on your car the negative side of the battery was grounded and the positive side connected to the generator by way of the starting switch, junction box, ammeter, and the cutout. It is very evident that at some time or other when your battery was replaced in the car, after having been charged, it was connected reversed, and the positive side grounded.

Luckily the shunt wound type of generator, such as is used in this system, is quite accommodating and will usually adapt itself to its environment, reversing its polarity to conform to that of the battery which it serves. It is to this peculiarity that the apparently strange circumstance is attributable.

SUBSTITUTION OF REGULATING RELAY ON MAXWELL

Q—In a 1916-25 Maxwell 12 volt Simms-Huff electric system the charging relay seems to give considerable trouble by burning out and not operating regularly. I was asked if another regulator could be installed on that system and put in a more accessable place. Advise regarding the above. Where can they be purchased?

2—What is the best book published on automobile painting?

3—Which is best for a garage floor as a preservative of tires, dry dirt, concrete or wood?

4—How can grease and dirt be removed best and easiest without injuring the paint on an automobile, especially around the springs, spring shackles, steering knuckles and axles?

5—What is the best way to lubricate springs? Which is best to use, grease or oil?

6—What is the best, purest and highest test gasoline on the market today?

7—Could a person from another state drive in the city of Chicago without a permit? If so, for how long?—Fred Hartman, P. O. Albert, Tucker Co., W. Va.

1—In a number of such cases the Ward-Leonard controller has been installed with satisfactory results. This device is made by the Wagner Electric Mfg. Co., 6400 Plymouth Ave., St. Louis. This concern will be very pleased to supply you with full instructions regarding the installation of the device.

2—The Chicago College of Auto Painting, 20 E. Jackson Blvd., Chicago, publishes a book which, we understand, covers the subject thoroughly.

Wiring of Ford Starting, Lighting and Ignition

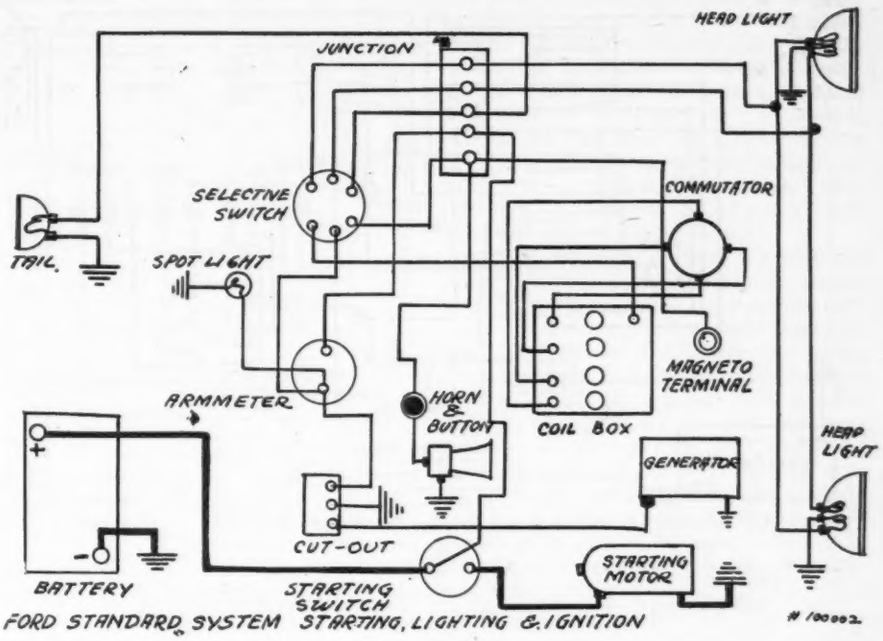


Fig. 2

3—It makes no great difference upon the line of tires what the material of the floor may be. The principal requisite is that the floor be kept clean and free of grease and oil.

4—A strong solution of soap and water or kerosene and water, a stiff brush and plenty of hard work will have the desired effect. This applies to the ports mentioned only and not to the body surfaces. For these a weak soap or kerosene solution and a soft sponge are recommended. The treatment is to be followed immediately with plenty of clean cold water.

5—An effective way is to spread the spring leaves apart with a screwdriver, chisel, or a tool designed especially for the purpose and apply a good graphite grease or a mixture of graphite and oil copiously. While the grease will last longer the oil will penetrate better, so between the two there is little to choose. The thoroughness of the application is the principle point.

6—It is counter to our policy to recommend any particular make or brand of car, apparatus or product.

7—The Police Department of Chicago extends the courtesy of a ten day immunity to visiting motorists.

GENERATOR OUTPUT FALLS OFF HIGH SPEED

Q—I have often noticed that after having new brushes installed and commutator turned, Dodge generators will often show discharge or very little charge at speeds over 20 m. p. h. till brushes have been thoroughly worn in, and I have one case where a car has been driven over 1,500 miles and still acts the same as though brushes were thoroughly sanded in and generator declared all right by two electric service stations.—Carl W. Spring, Cupertino, Cal.

Many automotive electricians make the mistake of suspending these armatures upon their shaft centers when dressing the commutator. This practice will result in most cases in turning the commutator out of round. While this has no effect upon the current output at low speed, at high speed it causes the brushes to vibrate and thus cuts down the generator capacity. It is recommended that the armatures be suspended upon their own ball bearings when the commutators are dressed. A true round job will result. Other causes which give rise to the same effect are loose commutator segments, loose brush holders, and loose connection throughout the system. The reply to your second question will be found under the caption "Proper Method of Adjusting Buick D-45 Clutch."

INSTALLING A SPOT-LIGHT ON 1921 FORD

Q—Publish diagram showing how to connect a spot-light on a 1921 Ford equipped with an electric starter and lights.—A Reader.

Se Fig. 2. The light may be connected anywhere in the system so long as it is to the positive side of the battery. The suggested connection is on the generator side of the ammeter, for the reason that it is easily made. If preferred it may be made to the selective switch on the same binding post with the wire which leads from the ammeter.

RESISTANCE UNIT FOR BATTERY CHARGING

Q—Advise where we can obtain the Ward Leonard Vitrohm Resistor Units for charging automobile batteries from 32 volt plants?—Milburn Motor Company, Milburn, Ky.

These units may be procured from the Westberg Engineering Company, Monadnock bldg., Chicago, or from the Ward Leonard Electric Company, Mount Vernon, N. Y.

Wiring, Mitchell, D40, '18, '19 & '20—Splitdorf System

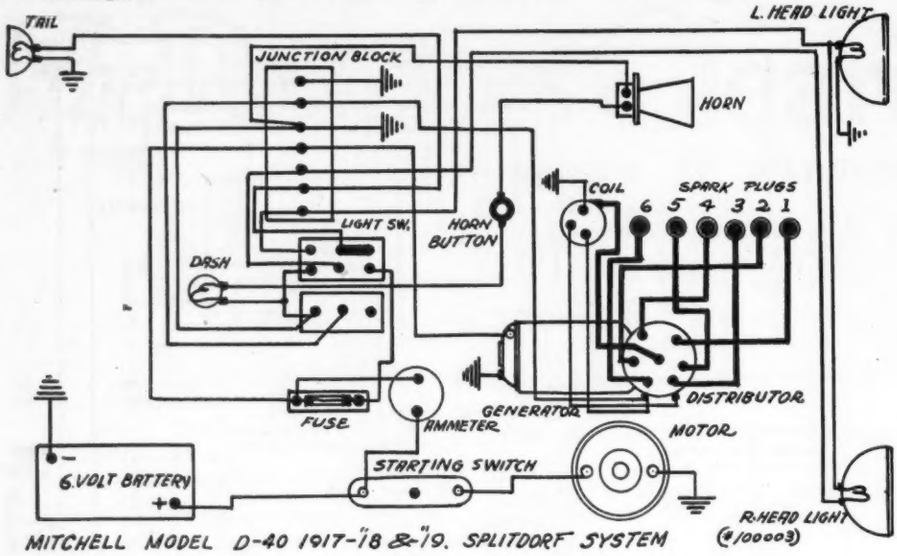


Fig. 3

Wiring Diagram of Overland Model 4

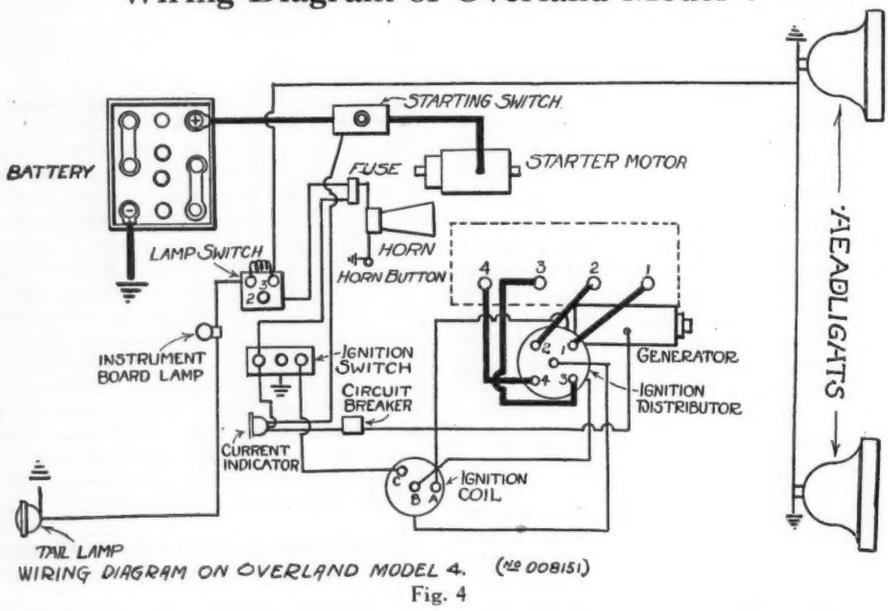


Fig. 4

ABNORMAL GROUND IN ELECTRICAL SYSTEM

Q—On a 1916 Model D King, the horn fails to function. The horn itself as well as the ground wires leading from it are all right. I now use the horn by connecting a lead from the negative battery terminal through an improvised switch to horn, using regular ground from horn to frame. But from positive battery terminal to horn through ground to frame it will not function. With regular connections made, an arc or flash occurs in the steering post ground when horn button is pressed. Could you suggest where to look for the trouble and what it may be?—Otto A. Brendel, Chicago.

Fig. 5 illustrates this system and shows that it is a straight two wire arrangement with the exception of the horn circuit in which there are two grounds, one from the horn to the frame and the other from the button to the ground. The latter ground wire, although it connects with the D-terminal of the Ward-Leonard regulator, is, in effect, as though it were directly connected to the negative side of the battery.

Now it at once becomes apparent that if any of the three wires leading from the positive side of the battery have become grounded not only will the horn not work, but, every time the button is pressed there will be a dead short circuit across the battery. This accounts for the flash at the ground connection of the steering post wire. It also accounts for the fact that the horn operates satisfactorily when connected directly to the negative side of the battery.

A voltmeter connected between the negative side of the battery and any part of the metal framework of the car ("the ground") will show an indication of 6-volts. Upon disconnecting all the wires from the positive side of the battery the voltmeter reading will return to zero. The trouble will most likely be found in one of the three wires, either in the heavy starting cable leading to the starting motor, in the small wire leading to the lighting switch, or in the other small wire leading to the A positive terminal of the Ward-Leonard regulator. To test, disconnect all three of these from both the battery and their other binding posts and with a long length of wire test between the respective binding posts and the positive terminal of the battery.. If everything is found clear reconnect the wires at their instrument ends and disconnecting one from the other strike them on the battery. The one that causes the voltmeter to register is at fault and should be replaced with a new one.

WIRING DIAGRAM OF MITCHELL MODEL D-1917

Q—Publish diagram showing wiring of ignition and lighting on Model D-40, 1917 Mitchell car—Helmer Beffalin, 324 West Jefferson Ave., Dallas, Tex.

See Fig. 3.

IGNITION RESISTANCE UNIT HEATS

1—What would cause the resistance unit on the ignition system of a Haynes 1917 model to heat up? This is a Lees-Neville 6-volt system and operates O. K. with the above exception. This resistance unit heats up so that the car cannot be started until it cools off.

2—Publish a wiring diagram for the Haynes 1917 model.—Harold Brown, Janesville, Wis.

1—Resistance units are designed for various capacities and it is possible that the one on your system is not capable of carrying the current demanded by the coil without overheating. Aside from the fact that the unit may burn out at any time, thus stalling the engine, the heating will do no harm.

The best remedy will be to replace the unit with a new one. We would call to your attention the fact that the ignition switch is not to be turned on until the engine is to be started. The fact that the resistance unit has been heated unduly, leads us to believe that you may have been in the habit of turning on the switch several minutes before starting the engine. This is bad practice and cannot be too strongly condemned, as it simply overheats the resistance unit and the ignition coil, besides unnecessarily draining the battery.

2—See Fig. 6.

SIMPLIFIED WIRING DIAGRAM OF OVERLAND LIGHT FOUR 1920

Q—Publish wiring diagram of Overland 4 number 11696, 1920.—Edgar Norris, Richmond, Ind.

See Fig. 4.

TESTING LUBRICATING OIL

Q—Advise if there is any reasonably simple method of testing lubricating oil to determine it desirability for automobile use. F. E. Brock, Wayne, Neb.

There is no simple method of making the test. To determine the flash and burning point, viscosity and carbon content, accurate instruments and careful experimentation is required. However, it should not be necessary for you to go to such great lengths, as the statements of the reputable oil companies regarding the qualities of their products may

King Model D 1915, '16, '17

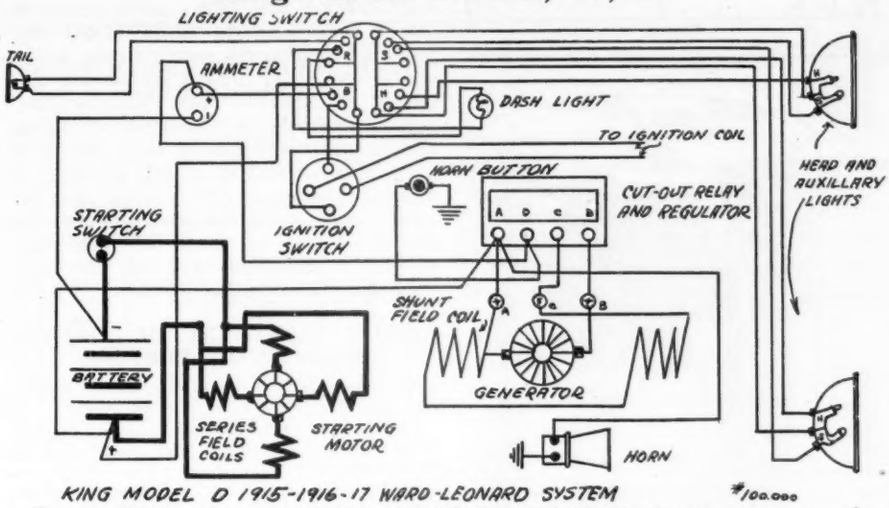


Fig. 5—Wiring diagram of King, Model D, 1915-16-17, showing two normal grounds in the horn circuit

Two Unit, Two Wire System on Haynes 40-41

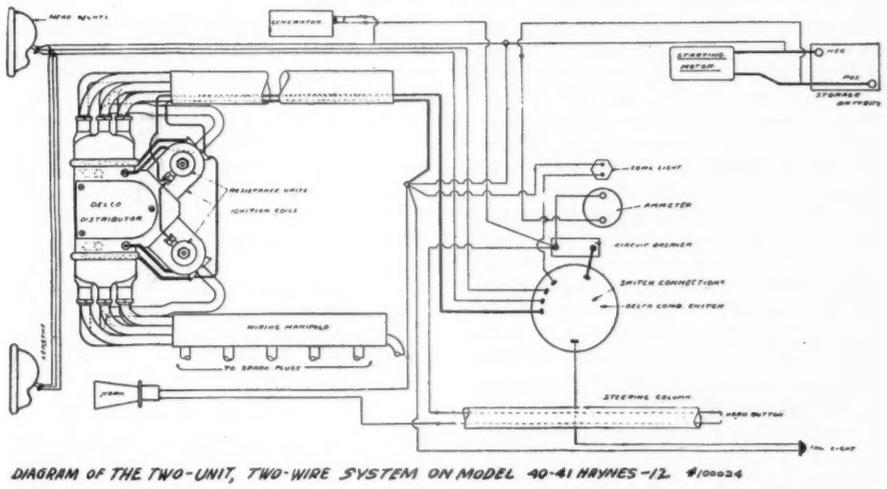


Fig. 6

be safely accepted. A recently developed hydrometer, manufactured by the Lubrication Appliance Manufacturing Co., 1464 E. 57th St., Chicago, is designed to show to what extent the crankcase oil may have become diluted by the heavy parts of the fuel passing the pistons.

ADJUSTMENT OF STROMBERG CARBURETER, TYPE M.

Q—Publish the correct setting of a Stromber carbureter Model M. 1, used on 1920 model Hupmobile—Charles M. Kuhn, Tiskilwa, Ill.

This new Stromberg Carbureter differs from older styles in that it is a plain tube type, having the air passages fixed in size, while the gasoline is automatically and accurately measured by the air flow itself for all speeds and loads. This uniform operation is made possible by the air bled nozzle construction, thoroughly covered by Stromberg patents. For high speeds the gasoline, after passing the orifice "F" is mixed with air taken through the bleeder "G" and holes in "H" to form a highly atomized mixture which passes through passage "N" to 8 discharge holes in the small venturi "I." For low speeds the gasoline does not enter the venturi at all, but is taken through the hole "J" to above the throttle, entering through the idling jet "K." The accelerating well "M" serves as a reservoir, which discharges on acceleration, and refills on deceleration, thus giving extreme flexibility, without requiring any abnormally rich adjustment of the steady running mixture.

There are two adjustments on this new Stromberg: "A," the main adjustment, controls the gasoline supply from the float chamber and regulates the mixture through the whole driving range. Turning nut "A" anti-clockwise, or to the left, raises the needle and gives more gas; clockwise, less. If an entirely new adjustment is necessary, turn nut "A" clockwise (to the right), until needle just seats, then open "A" 3 complete turns (to the left), which should give a mixture considerably rich. After starting and warming up the motor this adjustment may be regulated as necessary for the best driving mixture.

The gasoline for idling is taken in above the throttle and controlled by dilution with air from the inside of the carbureter, as regulated by screw "B," which should be between ½ and 1½ turns to the left, or anti-clockwise, from the seating position. After the motor is warm this may be regulated as necessary, turning to the right or clockwise, for more gas and to the left, or anti-clockwise, when less gas is required. Note the idle adjustment is effective only when throttle is nearly closed.

For starting and warming up with the present day fuel, it is absolutely necessary to use the dash or steering post control until proper operating temperature is attained. Ordinarily the motor will start readily with the control closed ½ to ¾ of the way. In very cold weather it may be necessary to pull the control up all the way, but this should be done only for an instant, as this cuts off all the air and delivers raw gasoline only. In starting with electric starter the throttle should be nearly closed, or it may be opened and closed while the starter turns the motor over. For hand cranking in cold weather the control should be almost completely closed, while the throttle should be one-fourth to one-third open.

After starting, the control should be adjusted as necessary and, allowing the motor a moment to steady itself, should be set at a point where the motor will have full power and yet not too rich a mixture for smooth running. As the engine warms up the control may be lowered. Instead of setting the mixture permanently rich it is much better to use a moderate setting and then to give intelligent attention to the operation of this control. For winter use it is advisable to partly cover the radiator, as a water temperature of 130 deg. Fahrenheit or above, is absolutely necessary if a motor is to show its normal flexibility and power.

Under such conditions the full supply of hot air should, of course, be used. In the warm months the season adjustment shutter on the air horn may be opened to admit cold air.

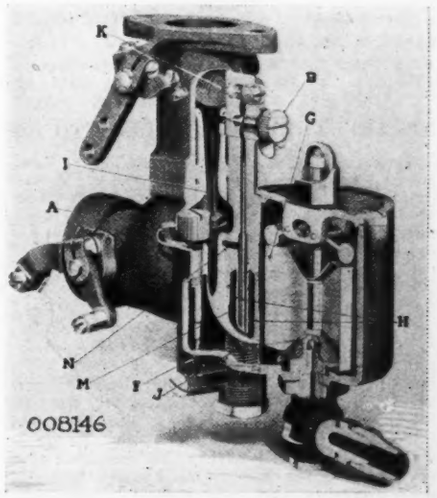


Fig. 7—Model M-1, Stromberg carbureter

ENGINES

INTERESTING DETAILS OF LIBERTY SIX, 1919

Q—Can the oil pump on a 1919 Liberty Six be adjusted to show the amount of oil pumped?

2—What is the bore, stroke and piston displacement?

3—What is the highest engine speed of this car and at what speeds does the engine develop the most power? How much power?

4—What is the gear ratio and maximum speed?—E. J. Kelleran, San Jose, Calif.

1—There is no provision made on the 1919 Liberty engine to show the quantity of oil delivered by the oil pump during a certain period of time. The lubrication system of this engine is of the standard combination splash and pressure feed design. The oil is circulated by the plunger pump of standard design driven by an eccentric on the camshaft. The cylinder walls, piston and connecting rod bearings are lubricated by splash from the connecting rods. The main bearings are lubricated by the oil fed directly from the pump under pressure. This pressure can be regulated by a pressure regulator connected to the oil line and located in the gear compartment. The pressure carried on the oiling system is indicated to the driver by a pressure gage carried in the instrument board located in the cowl of the body. This pressure indicator also serves as a check on the oiling system. So long as there is pressure shown on the gage, the oil is circulating. This pressure should run from one-half to one pound at idling speeds, to six to ten pounds at 25 to 30 m.p.h. As the main bearings become worn from service this pressure will naturally become slightly lower.

2—Bore 3¼ in. Stroke 4½ in. Piston displacement 224 cu. in.

3—Maximum speed as shown by the power curve in Fig. 9, 2200 r.p.m. Brake hp. at 2200 r.p.m., 41. S. A. E. rating 25.35 hp.

4—Gear ratio 4¾ to 1. The estimated speed is about 45 m.p.h. We are creditably informed that the car will exceed 50 m.p.h.

APPARENTLY NOTHING LEFT TO DO

Q—A 1913 Ford, one of the first coupe models that was built, never delivered the power and speed that was expected of it. I pulled the motor down, put in a new motor, block, pistons, connecting rods, valves, push rods, new transmission assembly, camshaft, timing gears, crankcase, etc. Everything was new with the exception of the flywheel and cylinder head. I had a very smooth running motor, but did not get any more power or speed. I also put in Burd high compression rings, which eliminated the oil pumping. After running it for 15 months like this I took a notion to ream out the valve ports and fit Fordson valves. I completed this job, reaming out the valve ports with a Ford valve reamer, also reaming the side ports. I am still using the Stromberg carburetor and a hot spot type manifold. I have tried different carburetors and manifolds. It doesn't climb a hill as it ought to. I have checked the timing, I even thought there might be a drag in the rear end, and therefore put in a new one. The speed is now between 25 and 30 miles. Advise how to get more speed and power.—G. S. Hunt, Beaver Dam, Va.

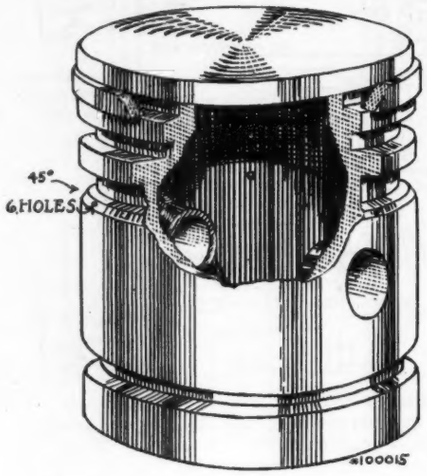


Fig. 8—Suggested remedy for oil pumping

It would seem that you have done everything humanly possible to make this car develop the desired power and speed. We can only suggest that you have been hampered by a loss in volumetric efficiency by the use of the hot-spot type manifold. We would suggest that the regular stock manifold be applied. This for the reason that the hot-spot type manifold is evidently expanding the gas too much before it gets into the cylinders.

SUGGESTED REMEDY FOR EXCESSIVE FUEL CONSUMPTION

Q—We have a 6 cylinder 1915 Velie touring car. The car works well but uses too much gasoline—about a gallon to every 8 miles. It is now equipped with a Stromberg H. B. No. 2 carbureter. Would a late model Stromberg or some other make save any fuel? What would be a reasonable mileage per gallon on this type of car? It weighs about 3000 pounds.—Davidson Jevning & Co., Climax, Minn.

While it is quite possible that a later model carbureter would accomplish a fuel economy, it is recommended that the condition of the car, throughout, be carefully checked and faulty parts remedied before the change is made. Loose pistons and improperly seated valves cause enormous power losses which are reflected in excessive fuel consumption. Again, improperly adjusted dragging brakes and underinflated tires absorb a surprising amount of power, the fuel to generate which is, of course, wasted. Late timing, even though it be by the margin of only one tooth, will cause inefficient performance with its attendant excessive consumption of fuel.

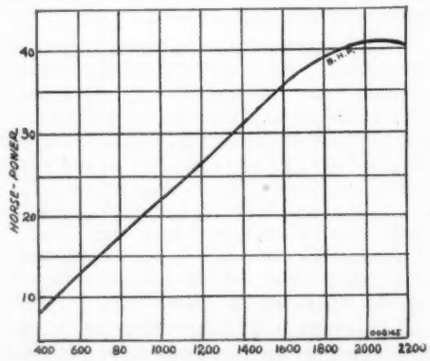


Fig. 9—Power curve of 1919 Liberty Six

SIMPLE TREATMENT OF PISTONS BENEFITS OIL PUMPING

Q—How much more power would Fordson valves installed on a Ford give?

2—Will a high tension magneto give more power in a Ford car than a Ford magneto?

3—Will a high tension magneto eliminate oil pumping on a Ford?

4—Give best known remedy for stopping oil pumping on a Ford car.

5—Will it require more power for Ford equipped with 30x3½ casings on front wheels than with 30x3?—Hugh Luton, Lindsay, Okla.

1—To the best of our knowledge there has never been a dynamometer test taken or a power curve plotted of the Ford engine equipped with the large valves. Consequently, we are unable to say what the increase in horse power would be, but that there is an increase is borne out by a number of reports from all over the country.

2—It is counter to our policy to recommend any make of apparatus in preference to any other make. Thousands of high tension magnetos have been installed on Ford cars with uniformly successful results.

3—No.

4—The illustration shown in Fig. 8 shows a simple method of partially or completely eliminating the objectionable pumping of oil past the pistons. The bevel below the bottom ring forms a 45 deg. angle with the surface of the piston. It is 1/32 in. wide, and together with six 3/32 holes drilled at equal intervals around the piston forms what is reported to be a satisfactory oil scraping and drainage expedient.

5—The difference in power required to drive 3½ in. tires through mud or sand as compared with that required to drive the standard 3 in. tire under the same conditions is quite appreciable.

LOCATION OF OVERLAND SERIAL AND ENGINE NUMBERS

Q—The Indiana state law requires that owners give the serial and engine numbers of cars when registering them for license. The car serial number is insufficient. For example, on the Overland model 75 to 90 we find a serial number only. Can you tell us where to find the engine number if there is one?—Emery Perkins, Raub, Ind.

The engine number of the model 75 Overland is stamped into the right motor arm or the right spring hanger. A simplified numbering system was adopted for the model 90, the serial number and engine number being the same for each car.

MISCELLANEOUS

TWO REMEDIES FOR WORN VALVE STEM GUIDES

Q—A Scripps Booth model C about 1917 has worn valve stems and valve guides; as these guides are not removable, how can they be taken care of?

2—Does this condition cause the car to be jerky and miss when running at low engine speeds?

3—What causes this Scripps Booth to back-fire when going down hill?. What is the remedy? It is equipped with a Master carbureter.

4—The car is equipped with a Bijur Motor Generator, and I would like to know what the generator output in amp. should be at 10-15-20 and 40 m. p. h. As the car speed is increased the ammeter shows about 10 amp. at about 20 m. p. h. and when the car speed is gradually increased to 40 or 45 m. p. h. the ammeter gradually falls back till it stands about 5 amp. discharges when giving 45 m. p. h. Is this right?—Philip Baker, N. S., Pittsburgh.

1—There are two ways to remedy this. One is to ream out the valve stem guides and install valves with oversize stem. The other is to replace the old head with a new one. The cost will be about equal in either case.

2—Yes. Air leaking past the worn stem will so dilute the mixture that the engine will miss at low speed.

3—Your inquiry is not clear, as you do not say whether the back-fire is through the muffler or the carbureter. We are of the opinion that you are letting the car pull the engine on a closed throttle. If this is the case the mixture is so lean that the change cannot ignite it and it consequently fires back through the carbureter or accumulates in the muffler where it is later fired by the intermittently ignited charges.

4—We should say about 10 amps. at 10 m. p. h. and between 12 and 15 amps. at all speeds over 15 m. p. h. The condition which you mention usaully indicates an out of round commutator or a high commutator segment. However, other causes such as loose brush holders or insecure connections throughout the system will also give rise to the same effect. We would suggest that you have the armature removed from the generator and the commutator dressed and undercut by a competent automotive electrician. Also have the whole generating circuit checked for loose connections, short circuit and ground.

PROPER METHOD OF ADJUSTING D-45 BUICK CLUTCH

Q—How is the clutch of D-45 and later Buicks adjusted to overcome slippage? Pedal is so adjusted as not to touch floor board in engaged position?—Carl W. Spring, Cupertino, Cal.

In the course of time the friction facing on the clutch disk will wear and when this occurs, the clutch should be adjusted to prevent slipping. Adjustment can be made by moving lock nut and adjusting nut on clutch release rod to allow more clearance between the clutch release bearing and the plate. When properly adjusted there should be 1/32-in. clearance between the ball bearings and the rear plate against which it operates. The position of the clutch pedal can be adjusted by means of the set screw in the rear end of the clutch release rod. Do not put any oil or grease on the clutch disk. A thorough washing with kerosene many times overcomes the slipping. The sectional view of this clutch shown in Fig. 10 illustrates the foregoing instructions clearly.

CALCULATION OF ENGINE BEARING DIMENSIONS

Q—For an engine of the internal combustion type, what per cent of bearing surface do you consider the most practical both in theory and in practice for the main and connecting rod bearings?—H. A. Muneke, Tulsa, Okla.

It is impossible to state the amount of bearing surface required for main and connecting rod bearings on a percentage basis. The bearing surface required depends upon the bore and stroke of the engine, the number of cylinders, the number of main bearings, the diameter of the bearings, etc. To make this plain, let us assume two four cylinder engines, one with only two main bearings and the other with five. The shaft of the former would be supported only at the ends, whereas the latter would be supported at both sides of each throw. The former would naturally have to be made considerably larger in diameter, owing to the greater bending strains on it. As a rough rule, for four and six cylinder engines with not more than two throws between supports, the crankpins and main bearings can be made of a diameter equal to one half the cylinder bore, the crankpins of a length equal to one and one-quarter the diameter, the front and intermediate main bearing of a length equal to one and one-half times the diameter, and the length of the bearing at the flywheel one inch longer than this.

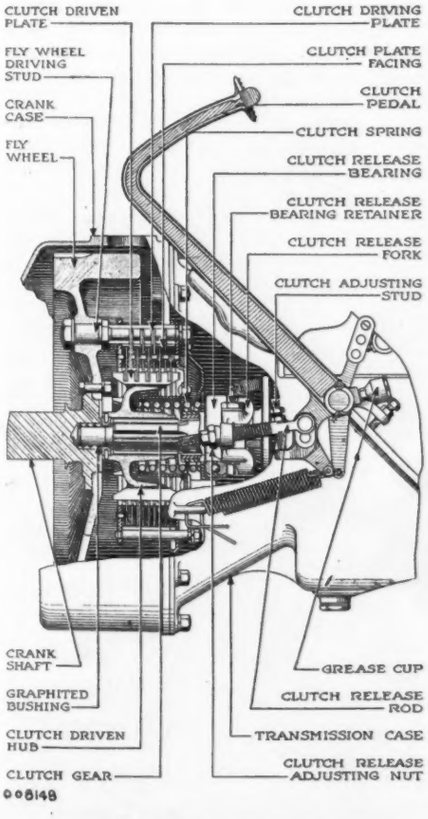


Fig. 10—Sectional view of clutch on Buick D-45

EXCESSIVE SIDE MOTION OF CONNECTING ROD

Q—Will side play in connecting rod cause knocks if play is enough to allow top end of rod to strike side of piston?—Wm. Hein, Ansley, Nebr.

The striking of the top of the connecting rod on the side of the piston should not, of itself, cause a knock. It is more than likely that the condition which causes this excessive side play is also causing the knock. Theoretically all parts, crankshaft, pistons, etc., should be held in such perfectly rigid alignment that the center of the rod will coincide with that of the piston. This, like all ideal conditions is difficult of realization, a close approach to it is the best that can be hoped for; this, for the reason that as the crankshaft wears, some end motion will be developed.

So long as this is not excessive it may be disregarded but when it becomes so great as to cause all of the connecting rods to move fore and aft of the engine to such an extent that their upper end strikes the side of the pistons it is time to have it remedied. In your case we suspect that the crankshaft thrust bearing has become so badly worn that the whole shaft, and with it the connecting rods, are floating fore and aft to an excessive degree. We would advise that the crankshaft be examined for end motion and the thrust bearings replaced.

CRANKSHAFT IS SPRUNG OR WORN

A Willys Overland, model 89 6-cylinder, 1919, has a tendency to vibrate at any speed, and to loosen the connecting rod bearings, or burn them out at every 100 or 150 miles of driving.

It cannot be driven in excess of 30 or 35 m. p. h. without a great vibration and other noises in the motor. It should do at least 55 without an effort. Oil and water circulation are good. State reasons for these conditions.—Frank Den Beste, Corsica, S. Dak.

We rather suspect that the crankshaft of this engine is either somewhat badly sprung, that its bearings are worn out of round, or that the thrust bearings are so badly worn that the shaft floats excessively from front to back and vice versa. Any one or all of these conditions would give rise to the trouble you mention. We suggest that you have the shaft removed and swung between centers in a lathe. Check for alignment of the main bearings and also their and the crank bearings' roundness. If the shaft is sprung it must be straightened. If the bearings are out of round they must be turned to true.

The Accessory Show Case

New Fitments for the Car

Critz Super Pressure Lubricating System

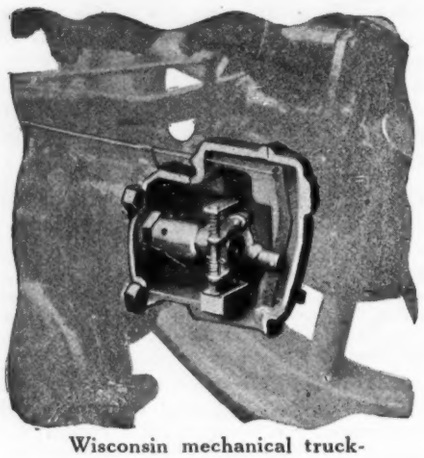
Forcing lubricant to steering simple bolts, spring shackle bolts and light parts under a pressure of up to 2,000 pounds is the purpose of the Critz Super Pressure Lubricating System and high pressure hand operative pump manufactured by the Lathan Auto Supply Co., San Francisco. The device is made in two sizes, one for passenger car lubrication and the other for use on trucks. The only difference is that the latter tool is larger and, consequently, holds more lubricant than the smaller size. This makes it possible to thoroughly grease several cars with one filling of the "gun."

The complete outfit consists of the gun and several small fittings which replace the various oil and grease cups throughout the chassis. These latter contain a ball check valve which closes instantly when the lubricator swiveled end fitting is removed from them, and thus prevent the grease from being forced back out of the bearing. A simple filler sleeve is supplied with the outfit by which the gun is quickly filled without the necessity of soiling the hands. By means of a special fitting, designated as number 5, the quick lubricator can be adapted to use on cars equipped with the fitting supplied by the manufacturer of a similar apparatus.

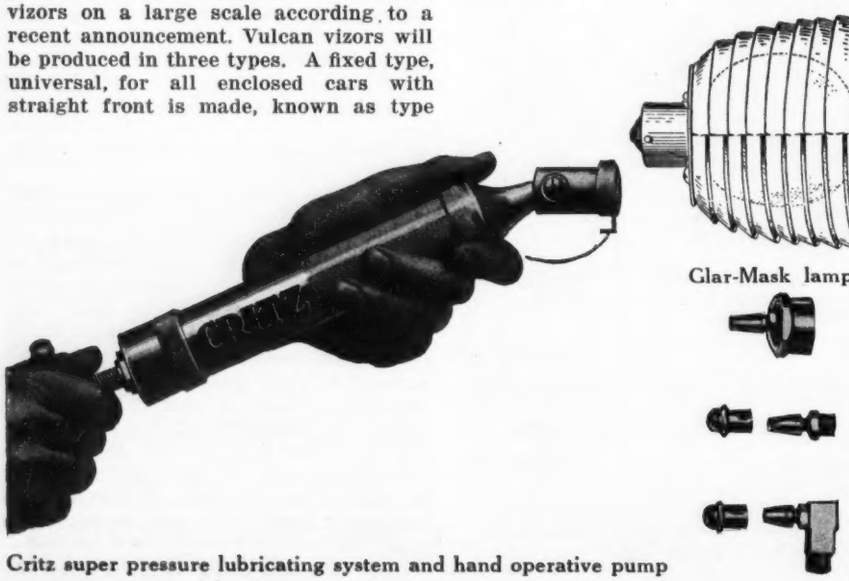
Windshield Vizor Is Latest Vulcan Product

The Jenkins Vulcan Spring Company of Richmond, Ind., are entering into the production and distribution of Vulcan vizors on a large scale according to a recent announcement. Vulcan vizors will be produced in three types. A fixed type, universal, for all enclosed cars with straight front is made, known as type A. This will be in part of the body itself, and the design is of such an artistic nature as to blend harmoniously into the lines of the car. The most careful engineering research was used as a basis for determining the length, slope, and other dimensions of the vizor to take care of the average type driver.

Type "B" is a universal, adjustable type for all enclosed cars. Vulcan vizors are made of the very best grade of Armco-rustless, cold rolled, 20 gage steel. They are non-rattling, and the finish is a special dull black effect in baked enamel. All types retail at $4.50. The vizors are designed to be easily applied, and to operate satisfactorily after application is made. Vizors are in great demand, as they are almost a necessity for protection from headlight glare, direct and indirect sun rays, rain, snow, sleet, etc. Vulcan vizors are sold exclusively through the jobbing trade.



Wisconsin mechanical truck-controller



Critz super pressure lubricating system and hand operative pump

Glar-Mask lamp

"Cut Speed" Governor for Ford Trucks

There is no gainsaying the fact that a speed controller on a commercial vehicle adds greatly to its life and economy of service. However, that governing engine speed rather than car speed is the proper method, is open to question. With this thought in mind the Wisconsin Mechanical Products Co. have developed the Truck-Controller for Ford Trucks. The device is designed for the attachment at the rear end of the drive-worm housing and is actuated by the worm gear. Up to whatever speed the device may be adjusted to permit, it remains inoperative, but upon the critical rate being attained, the governing apparatus goes into action and through the medium of a rod attached to the throttle valve, prevents the latter's being further opened.

It is apparent that at low truck speeds the device will have no effect upon the engine and that the latter can be run at maximum speeds to develop the maximum power needed in hard pulling. It is claimed that the price of the device, $30.00, will be saved many times over during years of service.

Glar-Mask Lamps Convert Dazzling Beam

The conversion of dazzling glaring waste light from headlamp bulbs into wide spreading diffused beams which light the full width of the road and throw the ditches up into bold relief, is the function of the Glar-Mask Lamps, manufactured by the Gill-Grindley Co., Urbana, Ill. This device is something on the order of the multi-prism lenses that have been used successfully for many years in marine light-house lanterns. The prisms are so arranged that they catch the rays which are ordinarily reflected upward as well as forward, and by refraction so bend them that they are sent forth across the roadway in a generous flood of illumination, rather than wasted on empty space. The masks are attached to highest grade nitrogen bulbs, the complete assembly being supplied for $1.50. They are designed for use in the lamps of passenger cars, both electric and gasoline, trucks and motorcycles.

Universal adjustable Vulcan vizor

Service Equipment
Time Savers for the Shop

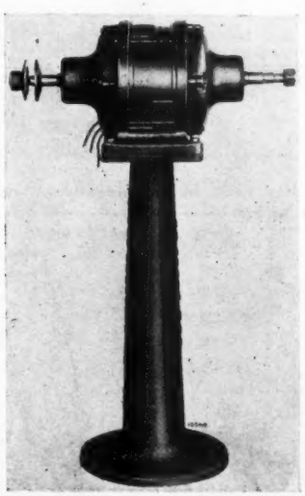
HB Self-contained Air Service Pump

The Hobart Brothers Co. of Troy, N. Y., well known manufacturers of small battery charging apparatus, announce the HB Automatic Air Outfit, designed for the use of garages and tire service stations. The outstanding features of the apparatus are that all gears, pulleys and belts have been eliminated, the pump being in-built into the unit and directly connected to the shaft of the low speed ball bearing motor.

As the pump operates in an oil bath, it is claimed that the device is practically noiseless and so light running that very little current is consumed. The automatic control is set to a cut in pressure of 150 pounds and a cutout pressure of 200 pounds. In conformity with its established policy the Hobart Brothers Co. is marketing the apparatus on the monthly payment plan.

Valley Self-contained Buffer and Grinder

The Valley Electric Buffer and Grinder, manufactured by the Valley Electric Co., St. Louis, is a self-contained dust proof unit mounted either on a 30 in. pedestal, or an 8 in. stand for bench installation. As the shaft extends from both ends of the apparatus two grinder wheels, or one wheel on one side and a wire or buffing brush on the other can be used as desired. The units are supplied in all horse powers ranging from ½ to 4 and in speed from 1800 to 3600 r. p. m. The standard machines are wound for 100 or 220 volts, 60 cycles, 2 or 3 phase AC. Direct current outfits will be supplied when desired.

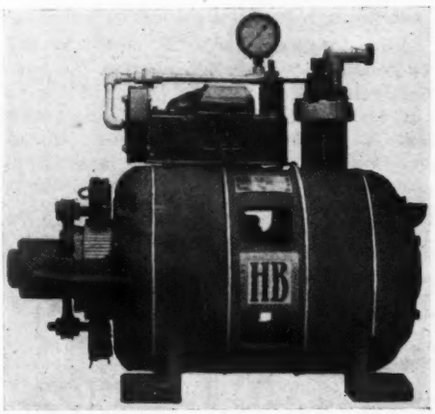


Valley electric buffer and grinder

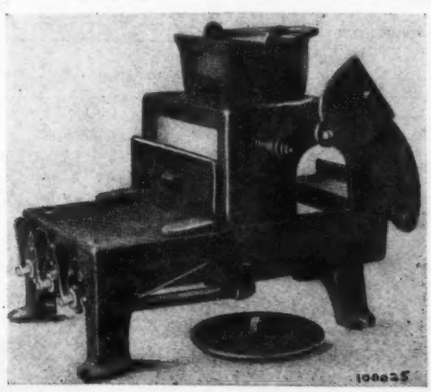
Rose everlasting battery clip

Battery Tools

The American Bureau of Engineering, Chicago, announces two new tools which are said to be time savers for the battery service station. One of these is a separator remover made on the order of a long putty knife. Sharp teeth, protruding from one side, dig into the wood of the separator and when the knife is withdrawn the part comes with it. The other is a scraper which is especially designed for the purpose of removing compound from the inside of battery cases.



HB automatic air service pump



Johnson No. 118 bench furnace

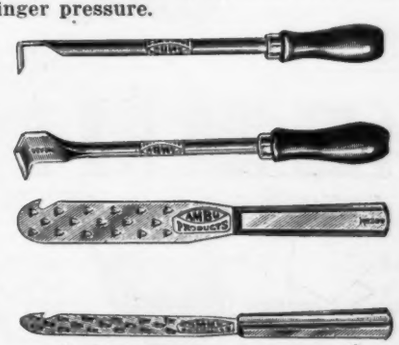
Johnson No. 118 Bench Furnace

A very versatile article of service shop equipment is the number 118 Bench Furnace, manufactured by the Johnson Gas Appliance Co., Cedar Rapids, Ia. Designed to operate direct from the gas mains without the interposition of a blower, the device is adaptable to many uses besides that of the heating of soldering coppers. In the top of the combustion chamber, which is lined with a highly refractory insulating composition, is a hole into which a 20 pound melting pot, six inches in diameter, may be inserted for the melting of lead, babbitts, or other bearing metals.

Two swinging doors, one on each side of the combustion chamber, permit of placing long rods in the device in such a way that any part in their entire lengths can be heated. A lid at the front of the combustion chamber is so designed that it almost completely covers the opening, leaving a slot at the top wide enough to permit of soldering coppers being inserted. When heating the latter, they are supported in the rear of the combustion chamber, there being a ledge which holds them clear of the bottom of the device and the tinned portions out of the direct flame blast.

Rose Everlasting Storage Battery Charging Clip

Designed for the express purpose of hooking up storage batteries for charging, the Rose Everlasting Battery Clip made by the Frank Rose Mfg. Co., Hastings, Nebr., is enjoying a warm reception from storage battery service stations. Though called a clip, the device is really a complete connector consisting of two clips, one at each end of a molded-in connecting cable. The clips proper are so made that they will make a firm, low resistance contact with the straight posts, or the flat cell connectors or the tapered inside holes of terminals. They are applied by opening with a light finger pressure.



Ambu separator remover and scraper

Automotive Repair Shop
Practical Maintenance Hints

Replacing Flywheel Rim Gear Teeth

The type of repair shown below is more or less familiar to most mechanics; however, the shouldered stud as will be noted on closer inspection is a deviation which will make a successful repair where the usual straight stud would fail. This repair for several teeth in the rim of the flywheel for the starting gear is entirely practical and dependable. The cost of this repair is far less than that of replacing the wheel.

The head of the stud is made of a large diameter, using cold rolled bar, nearly the width of the adjacent teeth. The flywheel is drilled at the center of the broken tooth and tapped out for a three-eighth inch stud. The circular bar is then cut down to this diameter and threaded. The flywheel is counterbored to the outside diameter of the bar, the section is screwed in and locked by a driven fitted dowel pin, to prevent its shifting position. The tooth shape is formed by cutting off the surplus metal with the hacksaw, and finishing with a file to a small template made of tin to the shape of the adjacent teeth.

Running-in an Engine

The Universal Motor Co., Marion, Ind., is using a contrivance for running-in a reassembled tractor motor.

The parts are hub-puller, driveshaft, universal joint and strap iron. The service truck is jacked up and the hub-puller on one end of the shaft attached to a wheel hub. The other wheel is tied stationary. The other end of the shaft, by a strap iron clamp, is fixed to the crank of the tractor. The service car engine is started and after the tractor motor has been turned over a few times, it is shifted into high. It is not necessary to demount the tractor motor to have this running-in stand available. The service car can readily be unhooked and put in service if a farmer telephones for some quick attention.

Shop-Made Vise or Tool Handle

The small tool shown in the drawing herewith, is a handy feature for the tool kit of any mechanic, and will serve to do the many small filing and fitting jobs where a pin, screw, dowel, key and other piece is to be held in place while filing and grinding. As a handle for the file, stub section of a hacksaw blade or chisel, this handle will stand rough treatment, hammering or driving without splintering up as would a wooden one. One of these handy aids can be made up in a half hour of spare time from a twelve-inch length of quarter-inch by half-inch bar stock.

File or chisel two "V" slots in the ends of the bar, double over at the center, grind off the edges, run a die over the end cutting a thread for a half-inch nut, and the tool is complete. For a larger tool a correspondingly larger section of stock is used and a larger nut is threaded over the jaws.

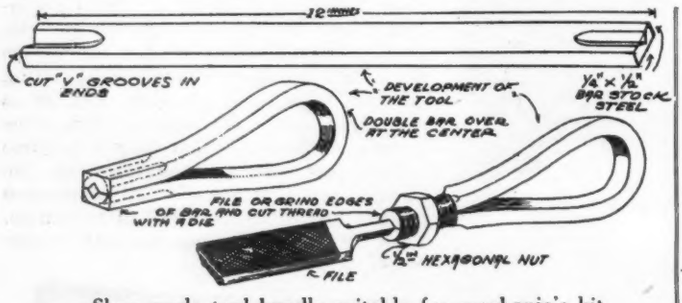
A Place for the Tire Gage

The garage man's great difficulty in giving service on tires is keeping an air gage where it can be had instantly. A good place to put it is on the end of the air hose.

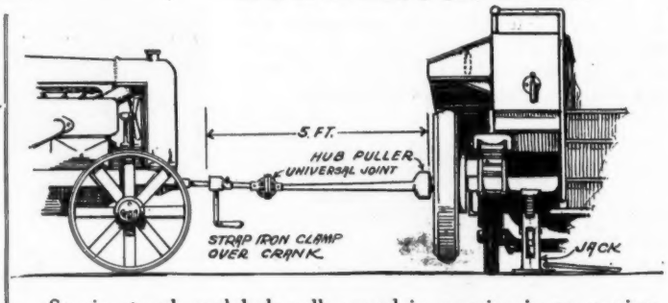
To do this, the following items are needed: an air gage, a cross length of tire chain, a short piece of wire, a short piece of ¾-in. hose, a small amount of tape, and the means to do a little soldering.

With these items laid out, proceed as follows: take the air gage apart by unscrewing the base and taking out the rubber case and retaining spring. Keep the parts in order, so they can be properly replaced. Now straighten hooks of the chain and file one end half flat and bend the other end into a loop for attachment to the air hose. Solder the flat end of the chain to the air gage case, taking care to make a neat joint, as the finished job will be covered with hose, and therefore it must not be too large.

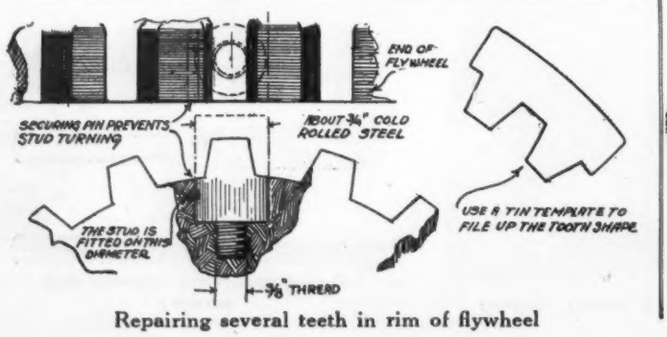
After the air gage is re-assembled, loop the chain around the air hose about 8 in. from the end and tie securely with the wire. Wrap the tie-up with tape to prevent any tearing or hurting of the hands. Cut a piece of the ¾-in. hose ⅛-in. shorter than the gage and slip it over the air gage, cutting a section out where the chain is soldered on. This will protect the gage from wear and abuse due to handling of the air hose. This method of handling the gage will be found of value in any size of garage, as it saves time, gages, and tires.



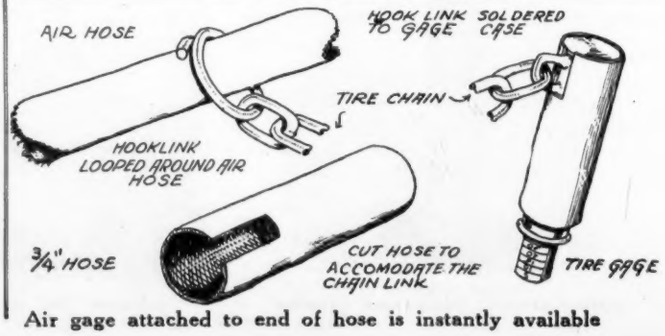
Shop-made tool handle suitable for mechanic's kit



Service truck and hub-puller used in running-in an engine



Repairing several teeth in rim of flywheel



Air gage attached to end of hose is instantly available

Fan Belt Sizes and Types
1920 Passenger Cars

Motor Age Maintenance Data Sheet No. 157

One of a series of weekly pages of information valuable to service men and dealers—save this page

Name and Model	Type of Belt	Width	Length	Degree of Angle
Ace		1⅛	36	....
Allen, 43	Flat	1¼	29⅞	.....
America, C	Flat	¾	33¾	.....
American Beauty	Flat	⅞	31½	.....
Anderson, S30	Flat	1¼	32⅞	.....
Apperson, 821	Flat	1¾	39⅛	.....
Auburn, 6-39	Flat	1¼	31	.....
Beggs, 20 T and 21T		1½	31	.....
Bour-Davis, 21S & F & R	Flat	1¼	37	.....
Brewster, 91	Chain driven	.....	.....	.....
Briscoe, 4-34	Flat	1	34¼	.....
Cadillac, S59	Do not use fan belt			
Case, V	Vee	¾	40	60
Chalmers	Flat	1¼	37¾	.....
Chandler	Flat	1	32⅛	.....
Chevrolet, 490	.....	21/32	9½	.....
Chevrolet, FB	.....	⅝	34¼	.....
Cleveland, 40	Vee	⅝	42	28
Cole Aero S-870	Vee	¾	44	.....
Climber, S	.....	1¼	34	.....
Columbia Six	Flat	1¼	31 11/16	.....
Commonwealth 45	Flat	1	32	.....
Crawford, 21-5-40	Vee	¾	39½	.....
Crow-Elkhart, L55	.....	¾	26	.....
Cunningham, V4	Gear driven	.....	.....	.....
Daniels, D19	Vee	¾	45½	.....
Davis, 51-57	Flat	1¼	36½	.....
Dodge Bros	Flat	1	22	.....
Dort, 15 and 10	Flat	1	28⅜	.....
Dixie Flyer, H.S.9000	Flat	⅞	33	.....
Dorris, 6-80	Flat	1	40⅜	.....
DuPont, A	Flat	1	33¾	.....
Elcar, 20-7R	Flat	1¼	34	.....
Elcar, 20-K4	Flat	1	29 5/16	.....
Elgin, K	Flat	1	37⅞	.....
Essex, A	Flat	1	41½	.....
Ferris, G21	Vee	⅝	43	.....
Franklin, 9B	Do not use fan belt			
Ford, T	Flat	1⅛	26 2/5	.....
Gardner, G	Flat	1	31½	.....
Geronimo, A45	.....	¾	32	.....
Grant Six	Flat	1¼	41¼	.....
Hanson, 54 and 60	Flat	1½	30	.....
Harroun	.....	1¼	31	.....
Hatfield, A42	Flat	1	33	.....
Haynes, 48	Flat	⅞	34 1/16	.....
Haynes, 47	Flat	¾	34½	.....
Holmes, 1921	Do not use fan belt			
Hudson Super Six, 0	Flat	1	34⅞	.....
Hupmobile, R5	Vee	⅝	24 19/32	45
Jackson	Flat	1¼	33⅝	.....
Jordan, M	Flat	1¼	31 5/32	.....
Kenworthy, 6-55	Vee	¾	38½	.....
Kissel	Flat	1	34 9/16	.....
Kline Kar, 6-55K	Flat	1¼	35	.....
LaFayette, 134	Chain driven	.....	.....	.....
Leach-Biltwell	Vee	¾	43	.....
Lexington, S	Flat	1¼	34¾	.....
Liberty, 10C	Flat	1¼	40½	.....
Lincoln	Vee	1	33¼	45
Locomobile, 48	Vee	¾	53¼	.....
Maibohm, B	Flat	1	37	.....

Name and Model	Type of Belt	Width	Length	Degree of Angle
Marmon, 34	Vee	¾	44	.....
Maxwell, 25	Flat	1½	44¼	.....
McFarlan, 147	Vee	¾	35¼	.....
Mercer, S5	.....	1	32½	.....
Meteor, R and RR	Flat	1¼	30⅝	.....
Metz, M Six	Flat	¾	33	.....
Mitchell, F40	Flat	1¼	33½	.....
Moon, 6-68	Vee	¾	39	.....
Moon, 6-48	Flat	1¼	31	.....
Monroe, S-10	Flat	1¾	44¼	.....
Nash, 681-2	Vee	¾	68	.....
National Sextet	Flat	1¼	38½	.....
Noma, 1C	Flat	¼	32½	11
Norwalk, 430-ES	Flat	¾	29	.....
Oakland, 34C	Vee	⅝	30¼	.....
Oldsmobile, 46	Vee	¾	44½	.....
Olympian, 45	Flat	¾	44	.....
Packard, Six	Vee	¾	49½	45
Packard, Twin Six	Vee	¾	45	28
Paige, 6-66	Flat	1¼	32⅜	.....
Paige, 6-42	Flat	1	36½	.....
Paterson, 650	Flat	1⅛	31½	.....
Peerless, 56, S6	Do not use fan belt			
Piedmont, 4-30	Flat	¾	29	.....
Piedmont, 6-40	Flat	¾	33½	.....
Pierce-Arrow, 38	Vee	⅝	38 21/32	.....
Pierce-Arrow, 48	Vee	⅝	38 21/32	.....
Pan, A	Flat	1¼	36¼	.....
Pilot, 6-45	Vee	¾	32	.....
Porter, 46	Round	⅜	36	.....
Premier, 6D	Vee	¾	39	.....
Ranger, B	Flat	1	35½	.....
Reo, T6 and U6	Vee	9/16	35	.....
ReVere, Series F	Flat	1¼	37	.....
Roamer, C6-54	Vee	⅝	37¾	.....
Roamer, D4-75	Flat	1¼	30⅜	.....
Rock Falls, 12	.....	1¼	39	.....
R & V Knight	Vee	⅝	34¾	.....
Saxon, 125	Flat	¾	39 13/32	.....
Sayers, Six D.P.	Flat	¾	37½	.....
Scripps Booth, B39	Vee	⅝	30½	.....
Seneca, L20	Flat	¾	26	.....
Severin	Vee	¾	45	.....
Sheridan	Vee	21/32	33¾	32
Skelton, 35	Flat	1	32¼	.....
Standard "8"	Do not use fan belt			
Stearns Knight	Flat	1	36¾	.....
Stephens, SS, 80	Vee	⅝	34½	.....
Stephens, Duryea, E	Flat	1⅛	42	.....
Studebaker, EH	Flat	¾	33¼	.....
Studebaker, EG	Flat	¾	33¼	.....
Stutz	Flat	⅞	36	.....
Templar, 445	Flat	1½	30⅝	.....
Texan, A, B-3	Flat	1	33½	.....
Tulsa, El-2-3	Flat	⅞	31	.....
Velie, 34	Flat	1	39	.....
Velie, 48	Flat	1¾	39½	.....
Westcott, C38	Flat	1¼	35 13/16	.....
Winther, 61	.....	1¼	34 15/16	.....
Winton, 25	Vee	⅝	43⅛	.....
Westcott, C48	Vee	¾	45	.....

Specifications of Current Passenger Car Models

NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Ace.....G	Guy	6-3¼x5	123	32x4	$2975	$2975	....	$3680	$3680
Ace.....H	H-S	6-3⅝x5	123	32x4	2975	2975	....	3680	3680
Ace.....L	H-S	6-3¼x5	116	32x4	2260	2260	....	....	....
Allen.....Series 43	Own	4-3½x5	110	32x4	†1385	1385	....	....	2195
Ambassador.....R	Cont	6-3⅛x5¼	136	33x5	....	†4500	$4500	....	6500
American.....C	H-S	6-3¼x5	127	32x4	2195	2275	†2350	....	3150
Anderson.....Series 40	Cont	6-3¼x4½	120	33x4	2195	1795	1845	2795	2795
Apperson.....8-21–S	Own	8-3¼x5	130	34x4½	....	†3500	3500	4500	4500
Apperson...Anniversary	Own	8-3¼x5	130	34x4½	....	†4250	4250	....	....
Auburn.....6-39	Cont	6-3¼x4½	120	33x4	....	1695	†1695	2795	2795
Beggs.....20T	Cont	6-3¼x4½	120	33x4	1775	1775	....	2675	2775
Bell.....4-32	H-S	4-3½x5	114	31x4	....	1495	....	....	....
Bell.....6-50	H-S	6-3¼x5	124	32x4	....	1695	....	....	....
Biddle.....81	Buda	4-3⅝x5½	121	32x4	3475	3475	....	....	3975
Birch Super-Four	H-S	4-3½x5	117	33x4	1345	1345	†1395	2295	2295
Birch Light Four	LeR	4-3⅛x4½	108	30x3½	1195	1195	....	....	....
Birch Light Six	H-S	6-3¼x5	117	33x4	1595	1595	....	....	....
Bour-Davis.....21S	Cont	6-3½x5¼	126	33x4½	†2385	†2385	2385	....	....
Brewster.....91	Own	4-4 x5½	125	32x4½	†7000	7000	....	....	10500
Briscoe.....4-34	Own	4-3⅜x5	109	31x4	1085	1085	....	1685	1685
Brook.....S-21 A	Own	2-3½x3⅜	90	28x3	395	....	....	....	....
Buick.....1922-41-5-6-7	Own	6-3⅜x4½	118	33x4§	1495	1525	....	2135	2435
Buick.....1922-48-9-50	Own	6-3⅜x4½	124	34x4½	....	....	1735	2325	2635
Bush.....E.C.4	Lyc	4-3½x5	116	33x4	....	1245	....	....	....
Bush.....E.C 6	Rut	6-3⅛x5	116	33x4	1295	1575	....	2050	2150
Cadillac.....59	Own	8-3⅛x5½	125	34x4½	3790	†3790	....	....	4950
			132	35x5	....	....	3940	....	5190
Carroll.....C	Roch	6-3½x5	128	....	3985	3985	....	....	....
Carroll.....D	Roch	6-3½x5	128	....	3185	3185	....	....	....
Case.....V	Cont	6-3½x5¼	126	34x4½	....	†2650	2650	3400	3750
Chalmers.....6-30	Own	6-3¼x4½	117	32x4	1495	1545	....	2295	2445
Chalmers.....6-30	Own	6-3¼x4½	122	33x4½	....	....	1795	....	....
Champion.....Tourist	Lyc	4-3½x5	113	32x3½	....	1250	....	....	....
Champion.....Special	H-S	4-3½x5	118	32x4	†1595	1595	....	....	....
Chandler.....Six	Own	6-3½x5	123	33x4	1785	†1785	1785	2785	2885
Chevrolet.....490	Own	4-3 1/16x4	102	30x3½	635	645	....	1155	1195
Chevrolet.....FB	Own	4-3 1/16x5¼	110	33x4	1185	1185	....	1885	1885
Cleveland.....40	Own	6-3 x4½	112	32x4	1295	1295	....	2195	2295
Climber Four	H-S	4-3½x5	117	....	1450	1385	....	....	....
Climber Six.....S	H-S	6-3¼x5	125½	32x4½	2250	2250	....	....	....
Cole.....870	Nort	8-3½x4½	127	33x5	3250	†3250	3250	4250	4450
Columbia.....D-C&CS	Cont	6-3¼x4½	115	32x4	1795	1795	....	2495	2595
Comet.....C-53	Cont	6-3½x5¼	125	33x4½	....	2350	2450	....	3650
Commonwealth.....44	H-S	4-3½x5	117	32x4	....	1595	....	....	2465
Crawford.....21-6-40	Cont	6-3½x5¼	122½	32x4	3000	3000	....	....	4500
Crow-Elkhart.....L63-65	Lyc	4-3½x5	117	32x3½	†1295	1295	....	....	....
Crow-Elkhart.....S63-65	H-S	6-3¼x5	117	33x4	†1545	1545	....	....	2395
Cunningham.....V-4	Own	8-3¾x5	142	35x5	....	....	....	....	....
Daniels.....D-19	Own	8-3½x5¼	132	34x4½	†5350	†5350	5350	6250	6950
Davis.....61-67	Cont	6-3¼x4½	120	33x4	†1995	1895	†2150	2795	2795
Dispatch	Wisc	4-3⅜x5	120	34x4	1290	1350	1350	1525	1575
Dixie Flyer.....H-S-70	H-S	4-3½x5	112	32x4	1445	1445	....	2295	2345
Dodge Brothers	Own	4-3⅞x4½	114	32x3½	935	985	....	1585	1785
Dorris.....6-80	Own	6-4 x5	132	33x5	....	†4785	4785	5800	6690
Dort.....17-12	D-Ly	4-3½x5	108	31x4	985	985	....	1535	1685
Dupont.....A	Own	4-3 1/16x5½	124	32x4½	3400	†3400	....	....	4900
Elcar.....K-4	Lyc	4-3½x5	117	33x4	1300	1300	....	....	....
Elcar.....7-R	Cont	6-3¼x4½	117	33x4	†1700	1700	....	2500	2600
Elgin.....K-1	Falls	6-3½x4¼	118	33x4	†1595	1495	....	2395	2395
Essex	Own	4-3⅜x5	108½	32x4	1445	1445	....	1950	2300
Fergus.....S-5-21	Own	6-3¼x5	126	33x4½	....	Chassis	Price	8500	....
Ferris	Cont	6-3½x5¼	130	32x4½	3350		*3350	....	4100
Ford.....T	Own	4-3¾x4	100	30x3½	**370	††415	....	695	760
Franklin.....9-B	Own	6-3¼x4	115	32x4	2550	2650	2550	....	3650
Friend.....Four	Own	4-3¼x4½	112	32x3½	†1285	1285	....	1985	2035
Gardner.....G	Lyc	4-3½x5	112	32x3½	†995	†995	....	....	2145
Globe.....B-10	Supre	4-3⅜x5	115	32x4	....	....	....	....	....
Grant.....Six	Own	6-3½x4½	116	32x4	1550	1550	....	2450	2450
H.C.S	Weid	4-3⅝x5½	120	32x4½	2925	†2975	....	3650	3850
Halladay.....21	Rut	6-3½x5	116	33x4	....	1985	....	....	....
Handley-Knight	Kn'ht	4-4½x4½	125	32x4½	....	....	2850	....	4185
Hanson Six.....60	Cont	6-3¼x4½	121	32x4	2185	2185	†2285	....	3165
Hanover Light	Own	2-3½x4	190	28x3	345	....	....	....	....
Harroun.....A-A-2	Own	4-3¼x5¼	106	30x3½	....	1195	....	....	....
Hatfield.....A-42	H-S	4-3½x5	115	32x4	1495	1495	....	....	2395
Haynes.....47	Own	6-3½x5	132	34x4½	3500	†2935	2935	....	4250
Haynes.....50	Own	6-3½x5	121	33x4	....	1985	....	....	....
Haynes.....48	Own	12-2⅞x5	132	34x4½	4200	†3635	3635	....	4950
Huffman.....R	Cont	6-3¼x4½	120	32x4	1845	1795	....	....	2775
Holmes.....Series 4	Own	6-3½x4¼	126	34x4½	†3350	....	3350	4250	4550
Hudson Super 6	Own	6-3½x5	126	34x4½	†2250	....	2250	3125	3250
Hupmobile.....Series R	Own	4-3¼x5½	112	32x4	1485	1485	....	2400	2435
Jackson.....638	Cont	6-3¼x4½	121	32x4½	†2685	1950	....	3760	3760
Jordan.....M	Cont	6-3¼x4½	120	32x4	2250	2250	....	3300	3300
Jordan.....F	Cont	6-3½x5¼	127	32x4½	....	....	2475*	....	3700
Kelsey.....GF	Own	6-3⅛x4¼	118½	32x4	1800	1800	....	2700	2700
Kenworthy.....8-90	Own	8-3 x5¼	130	32x4½	5000	5000	5250	6000	6000
Kessler.....K	Own	4-3¾x3¾	117	32x4	....	1995	....	....	2415
King.....J	Own	8-3 x5	120	32x4½	2740	†2725	*2725	....	4035
Kissel.....45	Own	6-3 1/16x5½	124	32x4½	3475	3475	....	4275	4275
Kline Kar.....6-55-K	Cont	6-3¼x4½	121	33x4	2290	2290	2290	3250	3290
Kurtz Automatic.....A	H-S	6-3¼x5	122	32x4	....	2250	....	....	3000
LaFayette.....134	Own	8-3¼x5½	132	33x5	4850	4850	4850	6250	6500
Leach.....21-A-B&C	Cont	6-3½x5¼	128	32x4½	‡5700	5200	5700	....	....
Lexington.....Series S	Cont	6-3¼x4½	122	32x4	....	1835	....	2750	3150
Lexington.....Series T	Anst	6-3¼x4½	128	32x4½	....	....	2785	....	3750
Liberty.....10-C	Own	6-3½x5	117	32x4	1795	1795	†1885	2825	2850
Lincoln	Own	8-3⅜x5	130	33x5	4300	4300	4300	4950	5400
Locomobile	Own	6-4½x5½	142	35x5	....	†8600	8600	....	....
Lorraine.....21-T	H-S	4-3½x5	114	32x4	1665	1665	....	2590	2590

NAME AND MODEL	Engine Make	Cylinders: Bore and Stroke	WB	Tires	2-Pass.	5-Pass.	7-Pass.	Coupe	Sedan
Maibohm.....B	Falls	6-3⅛x4¼	116	32x4	‡1575	$1575	†1750	$2395	$2395
Marmon.....34	Own	6-3⅜x5⅛	136	32x4½	4185	†3985	3985	4875	5275
Maxwell.....25	Own	4-3⅜x4½	109	30x3½	845	845	....	1445	1545
McFarlan.....1921	Own	6-4½x6	140	33x5	6300	†6300	6300	7500	7500
Mercer.....Series 5	Own	4-3¾x6¾	132	32x4½	4500	†4500	*4500	5700	6200
Merit	Cont	6-3¼x4½	119	32x4	2245	†2245	....	....	....
Meteor.....R&RR	Dues	4-4¼x6	129	32x4½	5500	5500	....	....	....
Metz.....M6	Rut	6-3½x5	120	32x4	1995	1995	....	2795	2895
Mitchell.....F-40	Own	6-3¼x5	120	33x4	‡1490	1490	†1790	2590	2690
Mitchell.....F-42	Own	6-3½x5	127	33x4	....	....	1995	....	....
Moller.....A	Own	4-2⅞x4	100	27x3½	2000	....	....	....	....
Monroe.....S-9 & 10	Own	4-3½x4½	115	32x3½	1295	1295	....	....	....
Monroe.....S-11 & 12	Own	4-3½x4½	115	33x4	....	....	....	2075	2175
Moon.....6-48	Cont	6-3¼x4½	122	32x4	2285	2185	2685	3185	3185
Murray-Mac Six	Own	6-3½x5¼	128	34x4½	4250	4250	4250	....	....
Nash.....681-7	Own	6-3¼x5	121	33x4	1525	1545	†1695	2395	2695
Nash.....682	Own	6-3¼x5	127	34x4½	....	....	1695	....	....
Nash Four.....41-4	Own	4-3¼x5	112	32x3½	1175	1195	....	1735	1935
National Sextet.....BB	Own	6-3½x5¼	130	32x4½	2990	†2990	2990	3990	3990
Nelson.....D	Own	4-3⅛x4¾	104	32x4	....	1900	....	....	....
Noma.....1C	Cont	6-3¼x4½	128	32x4½	3000	†3200	....	....	4450
Northway	Own	6-3½x5¼	128	33x5	4200	*4200	6000	5600	5400
Norwalk.....430-KS	Lyc	4-3½x5	116	32x3½	....	1135	....	....	....
Oakland.....34-C	Own	6-2 13/16x4¾	115	32x4	1145	1145	....	1815	1815
Ogren.....6-60	Own	6-3½x5¼	134	33x5	†3850	3750	3900	5000	5100
Oldsmobile.....43-A	Own	4-3 1/16x5¼	115	32x4	†1445	1445	....	2145	2145
Oldsmobile.....37A	Own	6-2 13/16x4¾	112	32x4	†1450	1450	....	2145	2145
Oldsmobile.....46	Own	8-2⅞x4¾	122	33x4½	....	†2100	2100	....	3300
Oldsmobile.....47	Own	8-2⅞x4½	115	32x4	....	†1695	....	2395	2395
Overland.....4	Own	4-3⅜x4	100	30x3½	695	695	....	1000	1275
Packard.....Single-Six	Own	6-3⅜x4½	116	33x4½	2975	2975	....	4150	4250
Packard.....Twin Six	Own	12-3 x5	136	35x5	6000	*6000	6000	8200	8450
Paige.....6-42	Own	6-3¼x5	119	32x4	1635	1635	1925	2450	2570
Paige.....6-66	Cont	6-3¾x5	131	33x4½	2975	‡3295	2875	3755	3830
Pan.....A	Own	4-3¼x5	108	33x4	....	1500	....	....	....
Pan American.E&F-6-55	H-S	6-3¼x5	121	33x4	2000	2000	....	....	....
Parenti.....1921	Own	8-2¾x4¼	125	32x4	....	2000	....	....	3000
Paterson.....650	Cont	6-3¼x4½	120	33x4	....	1895	1925	2895	2895
Peerless.....56–S–7	Own	8-3¼x5	125	34x4½	....	†2990	2990	3680	3950
Peters	Own	2-3½x3⅝	90	28x3	385	....	....	....	....
Piedmont.....4-30	Lyc	4-3½x5	116	32x3½	....	1270	....	....	....
Piedmont.....6-40	Cont	6-3¼x4½	122	32x4	....	1495	....	....	....
Pierce-Arrow	Own	6-4 x5½	138	35x5	8000	†7500	7500	8500	9000
Pilot.....6-45	Teetor	6-3½x5	120	32x4	1945	1895	....	....	....
Pilot.....6-50	H-S	6-3¼x5	126	32x4½	2285	2285	2335	3350	3400
Porter.....40	Own	4-4⅝x6¾	142	35x5	6750	Chassis	Price	....	....
Premier.....6-D	Own	6-3⅝x5½	126¾	33x5	3790	†3690	3890	4690	5190
Premocar.....6-40 A	Falls	6-3⅛x4¼	117	32x3½	....	1295	....	....	....
Raleigh.....A-6-60	H-S	6-3¼x5	122	32x4½	2250	2250	....	3100	3200
Ranger.....A-20	Own	4-3⅜x5	116	32x4	....	....	....	....	....
R & V Knight.....R	Own	4-3¾x5	116	32x4	....	2150	....	2850	2950
R & V Knight.....J	Own	6-3½x4½	127	32x4½	3350	†3350	3350	4000	4200
Reo.....T-6	Own	6-3 1/16x5	120	33x4	1850	1850	....	2700	2750
Revere.....C	Dues	4-3⅜x6	131	32x4½	4850	4650	†4650	....	6500
Roamer.....6-54–E	Cont	6-3½x5¼	138	32x4½	....	....	....	....	....
Romer	Cont	6-3¼x4½	120	32x4	2000	2000	2100	2450	2750
Rock Falls.....14000	Cont	6-3⅜x5	132	35x5	....	....	....	....	....
Rolls-Royce	Own	6-4½x4¾	143½	33x5	U. S.	Chassis	Price	†1750	....
Saxon.....125	Own	4-3⅜x5	112	32x4	....	1495	....	2295	2295
Sayers Six.....DP	Cont	6-3¼x4½	118	33x4	2495	2195	....	....	3295
Scripps-Booth.....B–39–42	Nort	6-2 13/16x4¾	115	32x4	‡1275	1295	....	1950	2100
Seneca.....L & O	LeR	4-3⅞x4½	108	30x3½	1045	1045	....	....	....
Severin.....Six	Cont	6-3½x5¼	122	33x4	1485	1485	....	2100	2250
Severin.....Six	Cont	6-3½x5¼	122	33x5	2550	2550	2550	3250	3350
Sheridan.....4	Nort	4-3 1/16x5¼	116	33x4	1485	1485	....	2060	2360
Sheridan.....8	Nort	8-3½x4½	132	33x5	....	....	....	....	....
Skelton.....35	Lyc	4-3½x5	112	32x3½	1295	1295	....	....	....
Southern Six.....660-2	H-S	6-3¼x5	127	32x4½	2875	2875	2995	....	....
Standard.....J	Own	8-3¼x5	127	34x3½	3400	†3400	3400	4500	4500
Stanley Steamer	Own	2-4 x5	130	34x4½	....	2600	2600	5650	5775
Stanwood Six	Cont	6-3¼x4½	118	33x4	2050	2050	....	2950	....
Stearns.....SKL4	Own	4-3⅜x5⅝	125	34x4½	2550	2450	2675	3400	3700
Stephens.....90	Own	6-3¼x4½	122	33x4½	1900	†1985	2065	3100	3100
Stevens Duryea.....E	Own	6-4⅞x5½	138	35x5	8500	†8000	8000	9500	9500
Studebaker.....EJ-40	Own	6-3⅛x4½	112	32x4	1500	1335	....	1695	1995
Studebaker.....EH-50	Own	6-3½x5	119	32x4	1585	1635	†1635	2450	2550
Studebaker.....EG-60	Own	6-3⅜x5	126	33x4½	....	....	1985	....	....
Stutz	Own	4-4⅜x6	130	32x4½	3250	†3350	*3350	4850	....
Templar.....A-445	Own	4-3⅜x5½	118	32x4	2385	2385	....	3185	3185
Texan.....A-38	Lyc	4 3½x5	115	33x4	1195	1195	....	....	....
Texan.....C-12	H-S	4-3½x5	115	33x4	1350	1350	....	....	....
Tulsa.....E-1-2-3	H-S	4-3½x5	117½	33x4	1385	1385	....	....	....
Velie.....48	Cont	6-3¼x4½	115	32x4	1885	1885	†2200	2885	2885
Velie.....34	Falls	6-3⅜x4¼	112	32x3½	1485	1485	....	....	2485
Vogue.....6-55	H-S	6-3¼x5	124	32x4	....	2285	2360	3050	3050
Vogue.....6-66	Cont	6-3½x5¼	124	33x4½	....	2485	2560	3250	3250
Washington	Fal's	6-3⅛x4¼	114	32x4	....	1685	....	....	....
Wasp.....2611	Wisc	4-4¾x5½	132	33x5	....	†5500	....	....	....
Westcott.....C-48	Cont	6-3½x5¼	125	32x4½	....	....	2990	....	4590
Westcott.....C-38	Cont	6-3¼x4½	118	33x4	2290	2290	†2290	3390	3390
Wharton.....A	Curt	8-4 x5	136	34x4½	....	†4885	4885	....	....
Wills Sainte Claire	Own	8-3¼x4	121	32x4½	3275	3200	....	....	....
Willys-Knight.....20	Own	4-3⅜x4½	118	33x4	1895	1895	....	2550	2750
Winther.....61	H-S	6-3¼x5	120	32x4½	....	....	2750	....	....
Winton.....25	Own	6-3¾x5¼	132	35x5	4000	†4975	4600	5950	†5950

*—6-passenger. †—4-passenger. ‡—3-passenger. +Special Body. **—Price without starter and demountable rims. Price with starter and demountable rims $465. ††—Price without starter and demountable rims. Price with starter and demountable rims $510.

Engine Make: Anst.—Ansted. Cont—Continental. Curt—Curtiss. D.Ly—Dort Lycoming. Dues.—Duesenberg. GBS—Golden, Belknap & Swartz. H-S—Herschell-Spillman. LeR—Leroi. Lyc—Lycoming. Nort—Northway. Roch—Rochester. Rut—Rutenber. Supr—Supreme. Tee—Teetor. Weid—Weidely. Wisc—Wisconsin. §—Model 47—34x4½ Tires.

Specifications of Current Motor Truck Models

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Acason	¾	$1650§	3¾x5	34x5†	34x5†	W
Acason, R	1	2260	3¾x5¼	36x3½	36x5	W
Acason, RB	1½	2485	3¾x5¼	36x3½	36x6	W
Acason, H	2½	3295	4⅜x5¾	36x4*	36x4d*	W
Acason, L	3½	4295	4⅜x5¾	36x5*	36x5d*	W
Acason, M	5	5250	5 x6¼	36x6	40x12	W
Ace, C	1½	2295	3¾x5⅛	34x3½*	34x5*	W
Ace, A	2½	2795	4¼x5½	36x4*	36x7	W
Acme, G	¾	....	3¾x5	35x5†	35x5†	W
Acme, B	1	....	3¾x5	34x3½	34x5	W
Acme, F	1½	....	3¾x5	34x3½	34x5	W
Acme, A	2	....	4½x5½	36x4	36x7	W
Acme, C	3½	....	4½x5½	36x5	40x10	W
Acme, E	5	....	4¾x6	36x6	40x12	W
Akr'nMulti-Trk	20	1995	4 x5¼	34x5	34x5	B
All-Power, C	3½	5800	4½x6	36x7	36x10	W
All-American, B-1	1	1795	3½x5	32x4	32x4	I
All-American C-1	1½	2195	3½x5	34x4	34x5	I
American, 25	2½	3350	4 x6	36x4*	36x4d*	W
American, 40	4	4275	4½x6	36x5*	36x5d*	W
Apex, G	1	1675	3½x5	33x5†	33x5†	I
Apex, D	1½	1915	3¾x5½	34x3½	34x4	I
Apex, E	2½	2695	4¼x5½	36x4	36x7	I
Apex, F	3½	3975	4½x6	36x5	36x10	I
Armleder, HW	2½	....	4¼x5½	36x4*	36x7*	W
Armleder, KW	3½	....	4½x6	36x5	36x5d	W
Armleder, 20	1	....	3¾x5¼	34x3½*	34x5*	W
Atco, B	1½	....	3¾x5¼	34x5†	36x6*	I
Atco, B1	1½	....	3¾x5¼	34x5†	36x6†	I
Atco, A	2½	....	4¼x5½	36x4†	36x8*	W
Atlas, M.D	1	....	3½x5	32x4½†	32x4½†	W
Atterbury, 20R	1½	2775	3¾x5	34x3½	34x5	W
Atterbury, 7CX	2½	3375	4⅜x5¼	36x4	36x4d	W
Atterbury, 7D	3½	4175	4½x5½	36x5	40x5d	W
Atterbury, 8E	5	5575	4¾x6	36x5	40x6d	W
Autocar, 21UF	1½–2	2300	4¾x4½*	34x4*	34x5*	D
Autocar, 21UG	1½–2	2400	4¾x4½*	34x4*	34x5*	D
Autocar, 26Y	....	4350	4¼x5½	34x5	36x10	D
Autocar, 26-B	....	4500	4¼x5½	34x5	36x10	D
Available, H1	1½	2750	4 x5⅛	36x3½*	36x5*	W
Available, H2	2½	3475	4 x5⅛	36x4*	36x8*	W
Available, H3	3½	4475	4½x5½	36x5	40x5d	W
Available, H5	5	5375	4¾x6	36x6	40x12	W
Available, H7	7	6000	5 x6	36x6	40x14	B
Avery	1	....	3 x4	34x5†	34x5†	I
Beck, A. Jr.	1	1800	3¾x5	34x3½	34x4	I
Beck, C	2	2550	4½x5½	36x4	36x6	I
Bell, O	2½	2750	4½x5½	34x4	34x7	I
Bell, E	1½	2250	3¼x5¼	34x3½	34x5†	I
Belmont, D	2	2675	3¾x5	34x3½*	34x6*	D
Belmont, F	3½	3525	4 x6	36x5*	36x5d*	D
Bessemer, G	1	1395	3½x5	35x5†	35x5†	I
Bessemer, H-2	1½	1995	3¾x5	36x3½	36x5	I
Bessemer, J-2	2½	2595	4⅜x5¼	36x4	36x4	I
Bessemer, K-2	4	3495	4½x5½	36x6	36x10	I
Bethlehem, K	1	....	3½x5	34x4½†	35x5	I
Bethlehem, G	2	....	4 x5¼	34x3½*	34x6*	I
Bethlehem, H	3	....	4 x5¼	36x4*	36x8	I
Bethlehem, J	4	....	4½x5½	36x5*	36x5d*	I
Bollstrom, 30	1½	2100	3¾x5¼	34x3½	34x6	I
Bollstrom, 50	2½	2800	4¼x5½	36x4	36x8	I
Bollstrom, 70	3½	3800	4½x6	36x5	36x10	I
Bollstrom, A-20	4	6000	5¾x7	40x8†	40x8†	I
Bollstrom, B21	4	5050	4½x5½	36x7	36x7	I
Bridgeport, A	1½	2350	3¾x5¼	34x3	34x6	W
Bridgeport, B	2½	2850	4¼x5½	36x4*	36x7*	W
Bridgeport, C	4	3650	4½x6	36x5	36x5d	W
Bridgeport, D	6	4500	4½x6	36x6	36x6d	W
Brinton, F	2½	3400	4⅛x5¼	36x4	36x7	W
Brockway, E	¾	1675	3¾x5	35x5†	35x5†	B
Brockway, S-4	1½	2250	3¾x5	36x3½*	36x5*	W
Brockway, K-5	2½	3200	4⅛x5½	36x4	36x7	W
Brockway, R-4	3½	4100	4½x5½	36x5	36x5d	W
Brockway, T	5	5250	4¾x6	36x6	40x6d	W
Capitol, G1	1½	2975	3¾x5	35x5	38x7	W
Capitol, H2	2½	3700	4¼x6	36x4	36x8	W
Capitol, K2	2½	4250	4¼x6	36x6	42x9	W
Capitol, M3	3½	4425	4¼x6	36x5	36x10	W
Case, ††	2	3000	4¼x5¾	36x6	38x7	I
Champion Light Commercial	½	1100	3½x5	32x3½	32x3½	I
Chevrolet, G	¾	820	3⅛x4	31x4†	34x4½†	B
Chevrolet, T	1	1225	3⅛x5¼	33x4†	35x5†	W
Chicago, C1	1½	....	3¾x5⅛	36x3½*	36x5*	W
Chicago, C2	2½	....	4 x5⅛	36x4*	36x7*	W
Chicago, C3	3½	....	4½x5½	36x5	36x10	W
Chicago, D5	5	....	4½x5½	36x6	40x12	W
Climber, A 20	1½	2450	3½x5	36x6*	38x7*	I
Clydesdale, 18	¾	1890	3¾x5	34x5	34x5	W
Clydesdale, 32C	1	2875	3¾x5½	34x3½*	34x5*	W
Clydesdale, 42C	1½	2750	4 x5½	36x3½	36x5	W
Clydesdale, 65C	2½	3540	4¼x5½	36x4	36x7	W
Clydesdale, 65EC	2½	3775	4½x5½	36x4	36x7	W
Clydesdale, 90C	3½	4400	4½x5½	36x5	40x10	W
Clydesdale, 120C	5	5500	4¾x6	36x6	40x12	W
Collier, 18	1	2350	3¾x5	34x4	34x5	W
Collier, 19	1½	2550	3¾x5	36x4	36x6	W
Collier, 21	2	2950	4⅛x5¼	36x4	36x7	W
Collier, 22	2½	3250	4⅛x5¼	36x4	36x4	W
Columbia, H	1½	2350	3¾x5	35x5†	34x5	I
Columbia, G	2½	2850	4 x5¼	36x4	36x7	I
Comet	1½	1950	3¾x5	34x4	34x4	W
Commerce, T	¾–1½	1450	3¾x5	34x4½†	34x4½†	B
Commerce, 12	1½	1800	3¾x5	35x5†	35x5†	I
Commerce, 16	2	2150	3¾x5	35x5†	35x6†	I
Concord, A	1½	2700	4 x5½	36x3½	36x6	W
Concord B	2½	3600	4¼x5½	36x4	36x8	W
Concord AX	1½	3150	4 x5½	36x3½	36x6	W
Concord, BX	2½	3600	4½x5½	36x4	36x8	W
Cook, 41	2	3000	4 x5½	36x6†	38x7†	I
Corbitt, E	1	$2400	3¾x5	34x3½	34x4	W
Corbitt, D	1½	2800	3¾x5	36x3½	36x5	W
Corbitt, C	2	3500	4¼x5¼	36x3½	36x7	W
Corbitt, B	2½	3650	4½x5¼	36x4	36x7	W
Corbitt, A	3½	4500	4½x5½	36x5	36x10	W
Corbitt, AA	5	5500	4¾x6	36x6	40x6d	W
Cyclone	1½	2800	3½x5	34x5†	36x6†	I
Dart, S	1½	....	3¾x5¼	34x3½	34x6	W
Dart, M	2½	....	4¼x5½	36x4	36x7	W
Dart, W	3½	....	4½x6	36x5	36x10	W
Day-Elder, A	1	2225	3¾x5	34x3½	34x4	W
Day-Elder, B	1½	2425	3¾x5	34x3½	34x5	W
Day-Elder, D	2	2900	4⅜x5¼	36x4*	36x7	W
Day-Elder, C	2½	3125	4¼x5	36x4	36x7*	W
Day-Elder, F	3½	3950	4½x5½	36x5*	36x5d*	W
Day-Elder, E	5	4875	4½x6	36x5	36x6d	W
Dearborn, F	1½	2180	3¾x5½	34x4*	34x5*	W
Dearborn, 48	2	2590	3¾x5⅛	35x5†	34x7†	W
Defiance G	1	1975	3¾x5	35x5†	35x5†	I
Defiance, D	1½	2550	3¾x5	35x5†	36x6†	I
Defiance, E	2	2750	3¾x5	35x5†	38x7†	I
DeKalb, E2	2½	2250	4½x5¼	34x3½*	36x5*	W
DeKalb, E2½	2	2600	4½x5¼	36x4*	36x6*	W
DeMartini 1½	1½	2600	3¾x5	34x3½	34x6	W
DeMartini 2	2	3300	4 x5½	36x3½	36x7	W
DeMartin i3	3	4250	4¼x5½	36x4	36x10	W
DeMartini 4	4	4800	4½x6	36x5	36x12	W
Denby, 12	1	2200	3¾x5	35x5	36x6	I
Denby, 33	1½	2300	3¾x5	35x5†	38x7†	I
Denby, 134	2	2800	3¾x5	36x3½	36x6	I
Denby, 25	3	3600	4½x5¼	36x4	36x7	I
Denby, 27	4	4600	4½x5½	36x5	36x5d	I
Denby, 210	5	5350	4½x5½	36x6	40x6d	I
Dependable, A	¾–1	1650	3½x5	34x5	36x6	W
Dependable, C	1½	2350	3¾x5¼	34x3½	34x5	W
Dependable, D	2	2650	4 x5½	34x5	36x6	W
Dependable, E	2½	2950	4¼x5½	36x4	36x7	W
Dependable, G	3½	3550	4½x6	36x6	38x7	W
Diamond T, O	1	2500	3¾x5¼	34x5†	36x6†	W
Diamond T, FS	1½	2960	3¾x5¼	36x3½	36x5	W
Diamond-T, T	1½	2650	3¾x5¼	36x3½	36x5	W
Diamond-T, U	2	3285	4 x5¼	36x4	36x7	W
Diamond-T, K	3½	4675	4¼x5½	36x5	36x5d	W
Diamond-T, EL	5	5400	4½x5½	36x6	40x6d	W
Diamond-T, S	5	5650	4¾x6	36x6	40x6d	W
Diehl, A	1	....	3½x5	34x4½	35x5	I
Diehl, B	1½	....	3½x5	36x6	36x6	I
Dispatch, F	1	1350	3¾x5	34x4†	34x4†	I
Doane	2½	4100††	4¼x5¾	36x5	36x7	C
Doane	3½	5100††	4⅜x5¾	36x5	36x5d	C
Doane	6	6000††	4¾x6¾	36x6	40x6d	C
Dodge Brothers	½	1035††	3⅞x4½	33x4†	33x4†	B
Dorris, K-4	2	3400	4¼x5½	36x4	36x7	W
Dorris, K-7	3½	4400	4¼x5½	36x5	36x10	W
Double Drive B	3	4000	4¼x5½	6	6	W
Douglas G	1½	2050	3¾x5⅛	36x5*	37x8*	W
Douglas I	3	3250	4¼x5½	36x6*	37x8*	W
Duplex, A	1½	2775	4 x5¼	35x5†	38x7†	W
Duplex, E	3½	4250	4¼x5½	36x8	36x8	I
Duty, 21	2	1490	3½x5	34x3½	34x5	I
Eagle, 100–2	2	2275	3¾x5¼	34x4*	34x7*	I
Erie, A	2½	....	4¼x5½	36x4	36x4d	W
F.W.D., B	3	4200	4¾x5½	36x6	36x6	B
Facto, 1921	2½	2895	4¼x5½	36x4*	36x8*	W
Fageol, 1½	1½	3000	3¾x5¼	34x3½*	34x6*	W
Fageol, 2½	2½	3900	4¼x5¾	34x4	36x7	W
Fageol 3½	3½	5000	4½x6¼	36x5*	40x5d*	W
Fageol, 5	5	5700	4½x6¼	36x6	40x6d	W
Famous, B10	1	1800	3½x5	36x3½*	36x4*	I
Famous, B12	1½	2100	3¾x5	36x3½*	36x5*	I
Fargo, R	2	2500	3¾x5	36x4	36x6	I
Federal, SD	1	2500	3¾x5	35x5†	36x6†	W
Federal, TE	1½	2725	4⅛x5¼	36x3½	36x5	W
Federal, UE	2	3025	4⅛x5¼	36x4	36x7	W
Federal, WE	3½	3950	4½x5½	36x5	36x5d	W
Federal, X 2	5–6	5350	4¾x5	36x6	40x6d	W
Ford, TT	1	495	3¾x4	30x3½*	32x4½*	W
Forschler, A	1	....	3½x5	34x3	34x4	W
Forschler, AX	1½	....	3½x5	36x3½	36x5	W
Forschler, B	2	....	4⅛x5¼	36x4	36x7	W
Forschler, BX	3	....	4⅛x5¼	36x4	36x8	W
Front Drive C	1½	2800	3¾x5½	5	4	W
Fulton, A	¾	1750	3½x5	35x5†	35x5†	B
Fulton, C	2	2350	3½x5	34x4	34x6	I
G & J**	2	3850	4x5¼	36x4	36x7	W
G & J**	3½	5175	4½x5½	36x5	36x5d	W
G.M.C., K15	¾	....	3½x5½	33x4½†	33x4½†	B
G.M.C., K16	1	....	3½x5½	34x5†	34x5†	B
G.M.C., K41	2	....	4 x5½	36x4*	36x7*	W
G.M.C., K71	3½	....	4½x6	36x5	40x5d	W
G M.C.,K101	5	....	4½x6	36x5	40x6d	W
G.W.W.	1½	2100	3¾x5½	35x5	35x5	I
Garford, 15	¾	1590	3⅝x5½	34†5*	34x5†	W
Garford, 25	1¼	2090	3¾x5½	36x3½	36x4	W
Garford, 70–H	2	3190	4¼x5½	36x4	36x7	W
Garford, 68D	5	5200	5 x6½	36x6	40x6d	W
Garford, 77D	3½	4390	4½x6	36x5	36x6d	W
Garford, 150–A	7½	5500	5x6½	36x6	40x7d	C
Gary, F	1	2100	3¾x5	36x3½	36x4	W
Gary, I	1½	$2550	4 x5½	36x3½	36x5	W
Gary, J	2½	3150	4¼x5½	36x4	36x7	W
Gary, K	3½	4050	4½x6	36x5	40x5d	W
Gary, M	5	5150	5 x6½	36x6	40x6d	W
Gersix M	1½	3100	4 x5½	36x3½	36x7	W
Gersix K	2½	3500	4½x5½	36x4	36x8	W
Gersix	3½	4500	4½x6	36x5	40x12	W
Giant, 15–A	1½	2250	3¾x5	34x3½	34x5	W
Giant, 16	2	3150	4¼x5½	36x4	36x7	W
Giant, 17	3½	4150	4½x5½	36x5	36x5d	W
Globe D–20	¾	1495	3⅝x5	33x4½†	33x4½†	..
Golden West, G	3½	4500	4½x5½	36x6	36x6	W
Golden West, H	3½–4	5000	4½x6	36x6	36x6	W
Golden West, GH	3	5000	4½x6	36x7	36x7	W
Golden West, T	4	5500	4¾x6	36x6	36x6	W
Golden West, K	7	6000	5½x6	36x6	36x6	W
Golden West, HA	7	6000	4½x6	36x6	36x10	W
Gove, A–1	2½	....	4⅛x5¼	36x4*	36x7*	I
Graham Bros. A	1½	2495	3¾x5	35x5†	36x6†	I
Gramm-Bern., 10	1	1495§	3½x5	33x5†	33x5†	B
Gramm-Bern., 15	1½	2050§	3¾x5	36x3½*	36x5*	I
Gramm-Bern., 65	1½	2725§	3¾x5	36x3½*	36x5	W
Gramm-Bern., 20	2	3175§	4½x5½	36x4*	36x7*	W
Gramm-Bern., 25	2½	3575§	4¼x5½	36x4*	36x4d*	W
Gramm-Bern., 35	3½	4375§	4½x5½	36x5	40x5d*	W
Gramm-Bern., 50	5	5275§	4¾x6	36x6	40x6d*	W
Hahn, J4	1	....	3¾x5	34x5*	34x5*	W
Hahn, CD	1½	....	4⅛x5¼	36x3½*	36x6*	W
Hahn, EE	2½	....	4½x5½	36x4*	36x8*	W
Hahn, F	3½	....	4½x5½	36x5*	36x10 *	W
Hahn, EF	5	....	4¾x6	36x6	40x12	W
Hal Fur, E	1	2350	4 x5	35x5†	35x5†	W
Hal Fur, B	2½	3250	4¼x5½	36x4*	35x5*	W
Hal Fur, F	3½	4250	4½x5½	36x5*	40x10†	W
Hall	1½	3100	3¾x5	34x5†	38x7†	W
Hall	2½	3275	4⅛x5¼	36x4	36x6	W
Hall	3½	4100	4½x5½	36x5	36x5d	W
Hall	5	5100	4½x5½	36x5	40x6d	W
Hall	7	5100	4½x5½	36x5	40x6d	C
Harvey, WEA	1½	2550	4⅛x5½	34x3½	34x5	W
Harvey, WFA	2½	3300	4¼x5½	36x4	36x7	W
Harvey, WHA	3½	4300	4½x6	36x5	36x5d	W
Harvey, WKA	5	5200	4½x6	36x6	40x6d	W
Hawkeye, K	1½	2365	3¾x5½	34x3½*	34x5*	I
Hawkeye, M	2	2915	4¼x5½	36x4*	36x6*	I
Hawkeye, N	3½	4345	4½x6	36x5*	36x10*	I
Hendrickson, K	5	4800	.....	.....	.....	..
Hendrickson, N	2½	3150	4¼x5¾	36x4*	36x7*	W
Hendrickson, M	3½	3975	4¼x5¾	36x5*	36x5d*	W
Highway, Knight A	4	....	4 x6	36x5	36x6d	W
Highway, Knight B	5	....	4 x6	36x5	40x6d	W
Higrade, A17	¾	1850	3½x5	32x4½	32x4½	W
Higrade, A18	1	2100	3½x5	35x5†	35x5†	W
Higrade, B20	1½	2500	4⅛x5¼	35x4†	36x6†	W
Huffman, B	1½	1995	3¾x5	34x3½	34x6	W
Huffman, C	1½	1795	3¾x5½	34x3½	34x6	I
Hurlburt	1½	....	4 x5½	34x4	34x5	W
Hurlburt	2½	....	4¼x5½	36x4	36x4d	W
Hurlburt	3½	....	4½x6	36x5	36x5d	W
Hurlburt	5	....	4½x6	36x5	40x6d	W
Huron Erie	1½	2425	3¾x5¼	36x3½	36x5	I
Huron Mich.	2½	2950	4¼x5½	36x4	36x7	I
Indep'd't(Iowa),G	1½	2010	3¾x5¼	34x3½	34x5	I
Indep'd't(Ia.),H.I.	2½	2940	4½x5¼	34x4	34x6	I
Indep'd't(Iowa), B	1	1665	3½x5	34x3½	34x4	W
Indep't'd(Ohio), F	1½	2585	3¾x5	36x3½	36x5	W
Indep't'd(Ohio) H	2½	3285	4⅛x5¼	36x4	36x4d	W
Indep'd't(Ohio) K	3½	4285	4½x5½	36x5	36x5d	W
Indiana, 12	1¼	....	3¾x5¼	34x3½*	34x5*	W
Indiana, 20	2	....	4½x5½	36x4*	36x7*	W
Indiana, 25	2½	....	4½x5½	36x4*	36x8*	W
Indiana, 35	3½	....	4⅝x5½	36x5*	36x5d*	W
Indiana, 51	5	....	5 x6¼	36x5*	40x6d*	W
Inland, D	2	2950	4 x5	34x5	34x6	I
International, S	¾	1500	3½x5	34x5†	34x5†	I
International, 21	1	1750	3½x5½	36x3½	36x3½	I
International, 31	1½	1850	3½x5½	36x3½	36x4	I
International, 41	2	2100	3½x5¼	36x3½	36x5	I
International, 61	3	2400	4¼x5	36x4*	36x6*	I
International, 101	5	3600	4¼x5	36x5	40x10	I
J & J, D	2	3250	4 x5	34x4*	34x6	I
Jackson, 4WD	3½	4550	4½x5½	36x7	36x7	B
Jumbo, 15	1½	2425	3¾x5¼	36x3½	36x5	I
Jumbo, 20	2	2675	3¾x5¼	35x5†	38x7†	I
Jumbo, 25	2½	3090	3¾x5¼	36x4	36x7	I
Jumbo, 30	3	3590	4¼x5½	36x6†	42x9†	I
Jumbo, 35	3½	4080	4½x6	36x5	36x10†	I
Jumbo, 40	4	4730	4 x6	38x7†	44x10	I
K-Z, 1	1	2250	3½x5	34x3½	34x5	W
K-Z, 1½	1½	2750	3¾x5	36x4	36x6	W
K-Z, 2½	2½	3250	4⅛x5¼	36x4	36x8	W
K-Z, 3½	3½	4250	4½x5½	36x5	40x10	W
K-Z, 5	5	5200	4½x5½	36x6	40x6d	W
Kalamazoo, G–1	1½	2495	3¾x5	34x4	34x5	W
Kalamazoo, G–2	1½–2	3100	3¾x5	36x4*	36x5*	W
Kalamazoo, H	2½	3700	4 x6	36x4	36x8	W
Kalamazoo, K	3½	4300	4¼x6	36x5	36x10	W
Karavan, A	2½	3900	4¼x6	36x4	36x8	W
Kearns, H	¾	1600	3¼x4½	32x4½†	32x4½†	I
Kearns, N	1½	2200	3½x5	34x3½	34x6	I
Kelly-Springfield K-31	1½	2900	3¾x5¼	36x3½	36x6	C
Kelly-S., K-34	1½	2900	3¾x5¼	36x3½	36x6	W
Kelly-S., K-36	2½	3250	3¾x5¼	36x4	36x4d	W
Kelly-S., K-35	2½	3250	3¾x5¼	36x4	36x4d	C
Kelly-S., K-40	3½	4200	4½x6½	36x5	40x5d	C
Kelly-S., K-41	3½	4200	4½x6½	36x5	40x5d	I
Kelly-S., K-42	3½	4200	4½x6½	36x5	40x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body. §—Price includes several items of equipment.

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Kelly-S., K-45	4	$4550	4½x6½	36x5	40x6 1	C
Kelly-S., K-50	5	4900	4½x6½	36x6	40x6d	C
Kelly-S, K-60	6	5100	4½x6½	36x6	40x7d	C
Keystone, 40	2	2450	3⅞x5⅛	34x5†	38x7†	I
Kimball, AB	2	3675	4 x6	36x4	36x7	W
Kimball, AC	2½	3975	4¼x6·	36x4	36x8	W
Kimball, AK	3	4500	4½x6	36x4	36x10	W
Kimball, AE	4	5000	4¾x6	36x5	40x12	W
Kimball, AF	5	5975	5 x6	36x6	40x7d	W
Kissel, Express	1	1985††	37 x5½	34x5†	34x5†	W
Kissel, Utility	1½	2775	37x5½	36x3½	36x5	W
Kissel, Freighter	2½	3475	4¼x5½	36x4	36x7	W
Kissel, H. D.	4	4475	4¼x5½	36x5	36x5d	W
Kleiber, AA	1	2600	4½x5¼	34x3½*	34x5*	W
Kleiber, A	1½	3100	4½x5¼	36x3½*	36x6*	W
Kleiber, BB	2	3600	4½x5¼	36x4*	36x7*	W
Kleiber, B	2½	4200	4½x5½	36x5*	36x8	W
Kleiber, C	3½	4900	4½x5½	36x5	36x5d	W
Kleiber, D	5	5600	5 x6½	36x6	40x12	W
Koehler, D	1½	....	3½x5	34x3½	34x5	W
Koehler, M	2½	....	4 x5⅛	36x4	36x7	W
Koehler, MCS	2½	....	4 x5⅛	36x4	36x7	W
Koehler, F	3½	....	4½x5½	36x5	36x10	W
Koehler, MT, Trac	5	....	4 x5⅛	36x4	36x7	W
L.M.C., 2-20	2½	2540	4½x5¼	36x4	36x4d	I
Lange, B	2½	3350	4¼x5¼	36x4*	36x8*	C
Larrabee, U	1½	2400	3¾x5	34x3½	34x5	W
Larrabee, K	2½	3400	4½x5¼	36x4	36x7	W
Larrabee, L	3½	4200	4½x5½	36x5	36x10	W
Larrabee, W	5	5100	4¾x6	36x6	40x6d	W
Lion, L	1	2350	3⅞x5⅛	35x5†	35x5†	W
Luedinghaus, C	1	2100	3½x5	35x5†	35x5†	W
Luedinghaus, W	1½	2700	3⅞x5¼	34x3½*	34x5*	W
Luedinghaus,	2-2½	3150	4¼x5¾	36x4*	36x7*	W
Maccar, L	1½	2925	4¼x5¼	36x4	36x6	W
Maccar, H-2	2½	3750	4½x5½	36x4	36x4d	W
Maccar, M-2	3½	4500	4½x6	36x5	36x5d	W
Maccar, G	5	5500	4¾x6	36x5	40x6d	W
MacDonald, A	7½	5750	4½x6	40x7	40x14	I
Mack, AB D.R.	1½	3450	4 x5	36x4	36x3½d	D
Mack, AB	2½	3400	4 x5	36x4	36x4d	C
Mack, AB Chain	1½	3000	4 x5	36x4	36x3½d	C
Mack, AB Chain	2	3300	4 x5	36x4	36x4d	C
Mack, AB D.R.	2	3750	4 x5	36x4	36x4d	D
Mack, AC Chain	3½	4950	5 x6	36x5	40x5d	C
Mack, AC Chai	5	5500	5 x6	36x6	40x6d	C
Mack, AC Chai	6½	5750	5 x6	36x6	40x12	C
Mack, AC Chain	7½	6000	5 x6	36x7	40x7d	C
Mack Trac., AB	5	3400	4 x5	36x4	36x4d	C
Mack Trac., AC	7	4950	5 x6	36x5	40x5d	C
Mack Trac., AC	10	5500	5 x6	36x6	40x6d	C
Mack Trac., AC	13	5750	5 x6	36x6	40x12	C
Mack Trac., AC	15	6000	5 x6	36x7	40x7d	C
Mapleleaf, AA**	2	4150	4 x5¼	36x4	36x7	W
Mapleleaf, BB**	3	4775	4¼x5½	36x4	36x4d	W
Mapleleaf, CC**	4	5770	4½x5½	36x5	36x5d	W
Mapleleaf, DD**	5	6825	4½x5½	36x6	40x6d	W
Master, JW	1½	2690	4⅛x5½	34x3½	34x5	W
Master, W	2½	3290	4¼x5½	34x4	36x7	W
Master, D	2½	3540	4¼x5½	34x4	36x7	D
Master, A	3½	4190	4½x6	36x5	40x5d	W
Master, E	3½	4640	4½x6	36x5	40x5d	D
Master, B	5	5290	4¾x6½	36x6	40x6d	W
Master, F	5	5440	4¾x6½	35x5	40x6d	D
Master Trac., T	6	5740	4¼x5½	36x7	36x4d	D
Maxwell, 1½	1½	1332	3⅝x4¼	32x3	32x4	W
Menominee, HT	1	2080	3⅝x5	34x3½	36x5	W
Menominee, H	1½	2725	4 x5	36x3½	36x5	W
Menominee, D	2	3245	4 x6	36x4	36x8	W
Menominee, G	3½	4270	4½x6	36x5	36x10	W
Menominee, J3	5	5450	4¾x6	36x6	40x12	W
Moline, 10	1½	2450	3½x5	34x5†	36x6†	I
Moreland, 20N	1	2850	3¾x5	35x5†	36x6†	I
Moreland, 21B	1½	2800	4½x5¼	36x3½	36x6	W
Moreland, 21C	2½	3500	4½x5½	36x4	36x8	W
Moreland, 21H	3½	4600	4¾x6	36x5	40x5d	W
Moreland, 21J	5	5000	4¾x6	36c6	40x6d	W
Mutual, 2B	2	3450	4 x6	36x4	36x8	W
Mutual, 2BP	2½	4150	4 x6	38x7†	42x9†	W
Napoleon, 7	¾-1	1350	3½x5	38x4	33x4†	I
Napoleon, XX-7	1	1535	3½x5	35x5*	35x5*	I
Napoleon, 11	1½	1860	3½x5	35x5*	36x6*	I
Nash, 2018	1	1895	3¾x5¼	35x5	36x6	I
Nash, 3018	2	2550	3¾x5¼	36x6	40x8	I
Nash, Quad.	2	3250	4¼x5½	40x8	40x8	I
*Nelson, F1½	1½	....	4½x5½	36x3½	36x5	W
*Nelson, F2	2	....	4½x5½	36x4	36x7	W
*Nelson, F3½	3½	....	4½x5½	36x5	36x5d	W
*Nelson, FC5	5	....	4¾x6	36x6	40x6d	W
Netco, D	2	3100	4½x5¼	36x4*	36x7*	W
Netco, H	2½	3500	4½x5½	36x4*	36x8*	W
New York, M	1½	....	4½x5¼	36x3½	36x5	W
New York, N	2-2½	....	4½x5¼	36x4	36x4d	W
Niles, E	2	3000	4½x5¼	36x4*	36x7*	W
Noble, B30	1½	2585	3⅝x5¼	36x3½	36x5	W
Noble, C40	2	2825	4 x5½	36x4	36x7	W
Noble, D50	2½	3150	4¼x5½	36x4	36x8	W
Noble, E70	3½	4010	4½x6	36x5	36x10	W
Northway, B-2	2	3400	4 x6	36x4	36x4d	W
Northway, B-3	3½	4400	4 x6	36x5	40x5d	W
Northwestern W	2	3300	4⅛x5¼	34x4	36x6	W
Northwestern WS	2½	3500	4½x5½	36x4	36x8	W
Norwalk, 25E	1	1695	3½x5	34x3½	34x4	W
Norwalk, 35E	1½	2025	3½x5	34x3½	34x3½d	W
Norwalk, 35E, Spec	1½	2285	3¾x5¼	34x3½	34x5	W
O. K., K1	1½	2675	4 x5½	36x3½†	36x5†	W
O. K., L1	2½	3450	4½x5½	36x4	36x8	W
O. K., M1	3½	4250	4½x6	36x5	36x5d	W
Ogden, A1	1½	$2559	3⅜x5	36x3½	36x5	W
Ogden, E	2½	3250	4½x5¼	36x4	36x7	W
Old Hickory, W	1	2175	3⅜x5	36x3½*	36x4*	W
Old Reliable, A	1½	2350	4 x5	34x4	36x6	W
Old Reliable, B	2½	3500	4¼x6	34x4	36x4d	W
Old Reliable, C	3½	4250	4½x6	36x5	36x5d	W
Old Reliable, D	5	5250	4¾x6	36x6	40x6d	W
Old Reliable, KLM	7	6000	4¾x6¼	36x6	40x7d	C
Oldsmobile Econ.	1	1500	3½x5¼	35x5†	35x5†	I
Olympic, A	2½	3500	4¼x5½	36x4	36x7	W
Oneida, A-9	1¼	2350	3⅜x5½	36x3½	36x5	W
Oneida, B-9	1¾	2915	4 x5¼	36x4	36x7	W
Oneida, C-9	2½	3390	4 x5¼	36x4	36x7	W
Oneida, D-9	3½	4345	4½x5½	36x5	36x10	W
One da, E-9	5	5460	4½x5½	36x6	40x12	W
Orleans, A	1½	2750	3⅜x5⅛	36x3½	36x5	W
Orleans, B	2½	3250	4x5¼	36x4*	36x7*	W
Orleans, C	3½	3750	4¼x5½	36x4½	36x8	W
Orleans, D	5	4250	4½x5½	36x6	40x8	W
Oshkosh, A	2	3750	3½x5	36x6†	36x6†	4
Oshkosh, AA	2	3850	3½x5	36x6†	36x6†	4
Oshkosh, B	2½	4150	4 x5⅛	38x7†	38x7†	4
Oshkosh, BB	2½	4300	4 x5⅛	38x7†	38x7†	4
Packard, EC	....	3700	4¾x5½	36x4	36x7	W
Packard, ED	....	4450	4½x5½	36x5	36x5d	W
Packard, EF	....	5550	5 x5½	36x6†	40x6d†	W
Packard, EX	....	4200	4¾x5½	36x6†	40x8†	W
Paige, 52-19	1½	2880	4 x5¼	34x3½	34x6	W
Paige, 54-20	2½	3400	4¼x5½	34x4	34x4d	W
Paige, 51-18	3½	4285	4½x5½	36x5	36x5d	W
Parker, FZ0	2	3500	4 x6	34x4	36x4d	W
Parker, J20	5½	4400	4½x6	36x5	40x5d	W
Parker, M20	5	5500	4¾x6	36x6	40x6d	W
Patriot, Revere	¾	1785	3⅜x5	35x5†	35x5†	W
Patriot, Lincoln	1½	2450	4 x5¼	34x3½*	34x5*	W
Patriot, Washgt'n	2½	3450	4½x5½	36x4*	36x7*	W
Piedmont, 4-30	1½	1685	3½x5	34x4†	34x4†	W
Pierce-Arrow,	2	3750	4 x5½	36x4	36x4d	W
Pierce-Arrow	3½	4950	4½x6¾	36x5	36x5d	W
Pierce-Arrow	5	5700	4½x6¾	36x5	40x6d	W
Pioneer, 59	1	1550	3¾x4¼	32x4½†	32x4½†	W
Pittsburger, B 21	2½-3	3800	4½x5¼	36x5*	36x7*	W
Pony	¼	400	2¾x4	28x3†	28x3†	C
Power, F	1½	....	3¾x5¼	36x6	36x6	W
Power, C	3½	....	4¼x5½	36x5	40x10	W
Premocar, B-143	1½	2475	3½x5	36x6†	36x6†	W
Ramier, R-11	¾	2150	3½x5	35x5†	35x5†	W
Rainier, R-15	3½	4500	4½x5½	36x5	36x5d	W
Rainier, R-19	1	2350	3½x5	34x3½	31x4	W
Rainier, R-16	1½	2600	3⅝x5	34x3½	34x5	W
Rainier, R-18	2	2950	4½x5¼	34x4	34x6	W
Rainier, R20	2½	3600	4½x5¼	34x4	34x7	W
Rainier, R17	5	5250	4½x6	36x6	36x6d	W
Ranger, TK-20-2	2	....	3¾x5	36x6†	36x6†	W
Reo, F	¾-1¼	1385	4½x4½	34x4½†	34x4½†	B
Reliance, 10A	1½	2500	4 x5½	36x3½	36x5	I
Reliance, 20B	2½	3200	4¼x5½	36x4	36x4d	I
Republic, 10	1	1695	3¾x5	35x5†	35x5†	I
Republic, 10Exp.††	1	2095	....	35x5†	35x5†	I
Republic, 11X	1½	2295	3¾x5	34x3½	34x5	I
Republic, 19	2½	2795	4½x5¼	36x4	36x7	I
Republic, 20	3½	3445	4½x5½	36x5	36x10	I
Republic, 7S	¾	1395††	3½x5	33x4½	33x4½	I
Riker, B	3	4600	4¼x6	36x5	36x5d	W
Riker, BB	4	4800	4¼x6	36x5	36x6d	W
Rowe, CW	1½	3000	3¾x5	36x6†	36x6†	W
Rowe, C. D. W.	2	3300	4 x5	34x4	36x3½d	W
Rowe, G. S. W.	3	4150	4 x6	34x5	36x5d	W
Rowe, G. P. W.	3	5250	3¼x5‡	38x7†	42x9†	W
Rowe, HW	4	4500	4¼x6	36x5	36x6d	W
Rowe, F. W.	5	5500	4½x6	36x6	40x6d	W
Rumely, A	1½	2720	3⅜x5¼	36x3½	36x5	W
Samson, KO 15	¾	....	3¾x4	32x4	32x4	B
Samson, E 25	1¼	....	3¾x5½	35x5	35x5	B
Sandow, G	1	2295	3¾x5	34x3½	34x5	W
Sandow, CG	1½	2598	3¾x5	34x4	34x6	W
Sandow, J	2½	3275	4¼x5¼	36x4	36x7	W
Sandow, M	3½	4295	4½x5½	36x5	36x5d	W
Sandow, L	5	4975	4½x5½	36x6	40x6d	W
Sanford, 25	2½	3350	4¼x5¼	36x4	36x4d	W
Sanford, 35	3½	4200	4½x5½	36x5	36x5d	W
Sanford, 50	5	5100	4¾x6	36x5	40x6d	W
Schacht, 2-Ton	2	3550	4¼x5½	36x4	36x7	W
Schacht, 2½-Ton	2½	3850	4¼x5½	36x4	36x4d	W
Schacht, 3½-Ton	3½	4350	4¼x6	36x5	36x5d	W
Schacht, 5-Ton	5	5350	4½x6	36x5	40x6d	W
Schwartz, A	1	1685	3½x5	33x4½†	33x4½†	B
Schwartz, BW	1½	2600	3⅜x5¼	34x3½*	34x7*	W
Schwartz, C.W.S.	2½	3200	4¼x5½	36x4	36x8	W
Schwartz, DW	5	4900	4½x6	36x6	40x12	W
Selden, 1½A	1½	2360	3⅜x5	34x3½	34x5	W
Selden, 2½A	2½	3425	4½x5¼	36x4	36x7	W
Selden, 3½A	3½	4175	4½x5½	36x5	36x10	W
Selden, 5A	5	5600	4¾x6	36x6	40x12	W
Seneca, M	1½	1020	3¼x4½	30x3½†	30x3½†	B
Service, 22D	1	2415	3½x5⅛	34x3½	34x5	W
Service, 15	¾-1	1840	3⅜x5	34x4½	35x5	B
Service, 31	1½	2985	4 x5½	36x3½	36x6	W
Service, 36	1½	3415	4¼x5½	35x5†	38x7†	W
Service, 51	2½	3475	4¼x5½	36x4	36x7	W
Service, 71	3½	$4285	4¼x5½	36x5	36x5d	W
Service, 76	3½	4485	4½x6	36x5	36x5d	W
Service, 101	5	5275	4½x6	36x6	40x6d	W
Signal, NF	1	2475	4¾x5	34x5†	36x6†	W
Signal, H	1½	2925	4½x5¼	34x4	36x6	W
Signal, J	2½	3275	4½x5¼	34x4	36x8	W
Signal, M	3½	4275	4½x5½	36x5	40x5d	W
Signal, R	5	5300	4¾x6	36x6	40x6d	W
Southern, 10	1	2090	3¾x5	34x3½	34x4	W
Southern, 15	1½	2590	3¾x5⅛	36x6†	34x4	W
Southern, 20	2	2990	4¾x5¼	36x6†	40x8*	W
Standard, 1-K	1-1½	1950	3¾x5	34x3½*	34x5*	W
Standard, 76	2½-3	3100	4½x5¼	36x4*	36x7*	W
Standard, 66	3½-4	4000	4½x5½	36x5	36x10	W
Standard, 5-K	5-6	5250	4¾x6	36x6	40x12	W
Sterling, 1½	1½	3200	4 x5⅛	36x3½	36x5*	W
Sterling, 2	2	3500	4 x5⅛	36x4	36x6	W
Sterling, 2½	2½	3650	4⅜x5⅝	36x4*	36x4d*	W
Sterling, 3½	3½	4650	4½x6¼	36x5*	40x5d*	W
Sterling, 5-W	5	5500	5 x6¼	36x6*	40x6d*	W
Sterling, 5-C	5	6000	5 x6¼	36x6	40x6d	C
Sterling, 7½	7½	6500	5 x6¼	36x6	40x7d	C
Stewart, 11	¾	1350	3½x4½	32x4†	32x4†	I
Stewart, 15	1	1875	3½x5	35x5†	35x5†	I
Stewart, 9	1½	2200	3¾x5	34x3½	34x5	I
Stewart, 7	2	2800	4½x5¼	34x4	34x7	I
Stewart, 7-X	2½	2950	4½x5½	34x4	34x7	I
Stewart, 10	3½	3850	4½x5½	36x5	36x5d	I
Stewart, 10-X	3½	3850	4½x6	36x5	36x5d	I
Stoughton, A	1	1995	3¾x5¼	34x4½†	35x5†	W
Stoughton, B	1½	2350	3¾x5¼	36x3½	36x5	W
Stoughton, D	2	2800	4 x5⅛	36x4	36x7	W
Stoughton F	3	3600	4¼x5½	36x5.1	36x5.1	W
Sullivan, E	2	3350	4¼x5½	36x4*	36x7*	W
Sullivan, H	3½	4650	4½x6	36x5	36x5d	W
Superior, D	1	1650	3¾x5	34x4½†	34x4	I
Superior, E	2	2600	4½x5¼	36x4	36x6	I
Super Truck, 50	2½	3300	4 x6	36x4	36x8	W
Super Truck, 70	3½	4300	4¼x6	36x5	40x5d	W
Super Truck, 100	5	5300	4¾x6	36x5	40x12	W
Super Truck 150	7½	6300	5 x6	36x6	40x7d	W
Texan, A38	¾	1095	3½x5	33x4	33x4	I
Texan, TK39	1½	1550	3½x5	36x6	38x7	W
Tiffin, GW	1½	2695	4½x5¼	36x3½	36x5	W
Tiffin, MW	2½	3580	4½x5¼	36x4	36x3½d	W
Tiffin, PW	3½	4760	4½x5½	36x5	40x5d	W
Tiffin, F50	5	5850	4¾x6	36x6	40x6d	W
Tiffin, F60	6	6050	4¾x6	36x6	40x12	W
Titan, HT	3½	4550	4½x6	34x4*	40x5d	I
Titan, HD	5	5400	4½x6	36x5	40x6d	I
Titan, TS	2½	3400	4½x5½	34x4*	36x4.1	I
Tower, J	1½	3000	4½x5¼	35x5	38x7	W
Tower, H	2½	3475	4½x5¼	34x4	36x7	W
Tower, G	3½	4400	4½x5½	36x5	36x5d	W
Traffic, C	....	1595	3¾x5	34x3½*	34x5*	I
Transport, 20	1	1850	3¾x5⅛	34x3½	34x4	I
Transport, 30	1½	2250	3¾x5	36x3½	36x5	I
Transport, 50	2½	2785	4¼x5½	36x4	36x7	I
Transport, 70	3½	4195	4½x6	36x5	36x10	I
Traylor, B	1½	2500	3¾x5⅛	34x3½	34x5	W
Traylor, C	2	3000	4 x5½	36x4	36x7	W
Traylor, D	3	3500	4¼x5½	36x4	36x8*	W
Traylor, E	4	4700	4½x6	35x5	40x10	W
Traylor, F	5	5100	4½x6	36x6	40x6d	W
Triangle, AA	¾-1	1600	3¼x5	35x5†	35x5†	I
Triangle, A	1½	2350	3¾x5¼	34x3½*	34x6*	I
Triangle, C	2	2700	3¾x5¼	36x4*	36x6*	I
Triangle, B	2½	2950	4 x5¾	36x4*	36x7*	I
Triumph, HB	2	2900	3¾x5¼	36x4	36x7	W
Triumph, HC	1½	2550	3¾x5¼	36x3½	36x5	W
Triumph, G	1	1995	3¾x5¼	34x5†	34x5†	W
Twin City, B.W.	2	3000	4 x5½	36x4	36x7	I
Twin City, A. W.	3½	4460	4¼x6	36x5	40x5d	W
Twin City, FWDB	3½	4750	5½x6	36x6	36x6	I
Twin City, FWDA	5	5250	5½x6	36x7	36x7	I
Ultimate, A	2	3200	4 x5½	36x3½	*36x6*	W
Ultimate, AJ	2	3250	4½x5½	35x5†	38x7†	W
Ultimate, B	3	3750	4½x5½	36x4*	36x4d*	W
Ultimate, BL	3	3350	4½x5½	36x4*	36x4d*	W
Union, F W	2½	3400	4 x6	36x5*	36x8*	D
Union, H W	4	4485	4½x6	36x6	40x12	D
Union, J W	6	5800	5 x6	36x6	40x14	D
United, A	1½	2445	3¾x5¼	36x3½*	34x5*	I
United, B	2½	3150	4½x5½	36x4*	36x7*	I
United, C	3½	3975	4½x5½	36x5	36x5d	I
United, V	5	5000	4½x6	36x6	40x6d	I
U. S., N	1½	2475	3¾x5	36x3½*	36x5*	I
U. S., R	3	3795	4 x5¼	36x4	36x4d	W
U. S., S	4	4595	4½x5½	36x5	36x5.1	W
U. S., T	6	5850	4¾x6½	36x6	40x6d	W
Velie, 46	1½	2200	3¾x5	36x3½	36x5	I
Veteran, E**	1-1½	3500	3¾x5¼	35x5†	36x6†	W
Veteran, A**	2-2½	4000	4¼x5½	36x4*	36x7*	W
Veteran, D**	2½-3	4400	4¼x5½	36x4*	36x7*	W
Veteran, H**	3½-4	5600	4¼x6	36x5	36x5.1	W
Victor, A	1½	2050	3¾x5	34x4	34x5	I
Vim, 29	½	1355	3½x4½	31x4†	31x4†	W
Vim, 30	½	1550	3½x4½	32x4½	32x4½	W
Vim, 31	1	2475	3¾x5⅛	35x5†	35x5†	W
Vim, 22	2	3150	3¾x5⅛	36x4	36x6	W
Vim, 23	3	3950	4¼x5½	36x5	36x5d	W
Vulcan, 25	2½	4000	4¼x6	36x4	36x8	W
Vulcan, 25P	3	4500	4¼x6	36x6	40x8	W
Walker-Johnson, B	2½	3500	4¼x5½	36x4	36x8	W
Walter, S	5	5600	4½x6¼	36x6	40x6d	D
Waltham, E	1½	2350	3¾x5¼	36x6†	38x7†	W
Ward-LaF., 2B	2½	3590	4⅜x5¾	36x4	36x7	W
Ward-LaF., 4A	3½	4690	4½x6¼	36x5	36x5d	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body. §—Price includes several items of equipment.

*Nelson Le Moon

Specifications of Current Motor Truck Models—Continued

NAME AND MODEL	Tons Capacity	Chassis Price	Bore and Stroke	TIRES Front	TIRES Rear	Final Drive
Ward-LaF., 5A	5	$5590	5 x6¼	36x6	36x6d	W
Watson, E	1	1865	3¾x5¼	34x4½†	34x4½†	W
Watson, N	3½	4250	4½x5½	36x5	36x10	W
Western, W1½	1½	2550	4½x5¼	36x3½*	36x5*	W
Western, L1½	1½	2550	3¾x5	36x3½*	36x5*	W
Western, W2½	2½	3250	4½x5¼	36x4	36x7	W
Western, L2½	2½	3250	4¼x6	36x4	36x7	W
Western, W3½	3½	4250	4½x6	36x5	40x5d	W
White, 15	¾	2400	3¾x5⅛	34x5†	34x5†	B
White, 20	2	3250	3¾x5⅛	36x4*	36x7	D
White, 40	3½	4200	3¾x5¾	36x5	40x5d	D
White, 45	5	4500	4¼x5¾	36x6	40x6d	D
White Hick., E	1	2450	3¾x5	34x5†	34x5†	W
White Hick., H	1½	2750	3¾x5	36x3½	36x5	W
White Hick., K	2½	3350	4½x5¼	36x4	36x5	W
Wichita, K	1	2300	3¾x5¼	36x3*	36x4*	W
Wichita, L	1½	2600	3¾x5¼	36x3½*	36x5*	W
Wichita, M	2	2800	3¾x5¼	36x3½*	36x6*	W
Wichita, R	2½	3000	3¾x5¼	36x4*	36x7*	W
Wichita, RX	2½	3600	4¼x6	36x4*	36x8*	W
Wichita, O	3½	$4000	4¼x6	36x5*	36x5d*	W
Wichita, S	5	5000	4½x6	36x6	40x6d	W
Wilcox, AA	1	2100	3¾x5½	36x4*	36x4*	W
Wilcox, B	1½	2775	4¼x5	36x4	36x5	W
Wilcox, D	2½	3300	4¼x5	36x4*	36x3½d*	W
Wilcox, E	3½	4250	4½x6	36x5*	36x5d*	W
Wilcox, F	5	5200	4¾x6½	36x5	40x6d	W
Wilson, F	1½	2270	3¾x5	36x3½	36x5	W
Wilson, EA	2½	2825	4½x5¼	36x4	36x7	W
Wilson, G	3½	3685	4½x5½	36x5	36x5d	W
Wilson, H	5	4520	4¾x6	36x6	40x6d	W
Winther, 751	¾	1795	3½x5	34x4½†	35x5†	I
Winther, 430	1½	$2850	3¾x5	32x4	32x4	I
Winther, 39	1½	2450	3¾x5	34x3½	34x5	I
Winther, 49	2	3250	4 x5	34x4	34x4d	I
Winther, 70	3½	4200	4 x6	36x5	36x5d	I
Winther, 450	4	3690	4 x5	34x5	36x6	I
Winther, 109	5	5250	4½x6	36x6	40x5d	I
Winther, 140	7	5900	5 x6	36x6	40x7d	I
Wisconsin B	1	....	4 x5¾	34x5†	34x5†	W
Wisconsin C	1½	....	4¾x5¾	34x5†	36x6†	W
Wisconsin D	2½	....	4½x6¼	36x6	36x10	W
Wisconsin E	3½	....	5 x6¼	36x6†	36x12†	W
Witt-Will, N	1½	2750	3¾x5	36x3½*	36x5*	W
Witt-Will, P	2½	3250	4½x5¼	36x3½*	36x7*	W
Wolverine, J	1	2240	3½x5	34x3	34x4	I
Wolverine, J	1½	2495	3¾x5	34x3½	34x5	I
Wolverine, J	2	2750	3¾x5	34x4	34x7	I
Wolverine, J	2½	3475	4¼x5¼	36x5	36x10	I
Wolverine, L	3½	4150	4½x5½	36x5	36x10	I
Yellow Cab M21	¾	2050	3¾x5	32x4	32x4	B
Yellow Cab M41	1½	2350	3¾x5	34x4½	34x4½	W

*2-cyl. †6-cyl. ‡8-cyl. All others, not marked, are 4-cyl. Trac., Tractor. **Canadian made.

Final Drive: W—Worm, I—Internal Gear, C—Chains, D—Double Reduction, B—Bevel, 4—Four-Wheel, E—External Gear. *Tires—optional. †Pneumatic Tires. All others solid. ††—Price includes body. §—Price includes several items of equipment.

Farm Tractor Specifications and Prices

TRADE NAME	Rating	Price	Wheels or Crawlers	Engine	Cylinders: Bore, Stroke	Fuel	Plow Capacity
All-In One	16-30	$1975	3	Clim.	4-5 x6½	GDK	3-4
Allis-Chalm..B	6-12	925	2	LeR.	4-3⅛x4½	Gas.	1
Allis-Chal.G.P	6-12	850	2	LeR.	4-3⅛x4½	Gas.	1-2
Allis-Chalm.	12-20	1495	2	Mid.W	4 4⅛x5¼	Gas.	2-3
Allis-Chalm.	18-30	2150	4	Own	4-4¾x6½	GorK	3-4
Allis-Chalm	10-18	875	4	Own	4-4¾x6½	G,K	4
Allwork...2-G	14-28	....	4	Own	4-4¾x6	GorK	3
Allwork.....C	14-28	....	4	Own	4-5 x6	GorK	3
AndrewsKin.D	18-36	2700	4	Clim.	4-5 x6½	GorK	4
Appleton	12-20	1500	4	Buda	4-4¼x5½	G,K	2-3
Aro.....1921	3-5	550	4	Own	1-4¾x5	Gas.	1
Aultman-T....	15-30	2200	4	Clim.	4-5 x6½	G,K	4
Aultman-T....	22-45	3850	4	Own	4-5½x8	G,K	6
Aultman-T....	30-60	5000	4	Own	4-7 x9	G,K,D	8
Automot. B-3.	12-24	1785	4	Here.	4-4 x5½	Gas.	2-3
Avery.SR.Cul.	5-10	....	4	Own	4-3 x4	G,K	..
Avery..Cult-C	.....	....	3	Own	6-3 x4	G,K	..
Avery.....B	5-10	....	4	Own	4-3 x4	G,K	2
Avery.....C	.....	....	4	Own	6-3 x4	G,K	..
Avery.....	8-16	....	4	Own	2-5½x6	G,K,D	2-3
Avery.....	12-20	....	4	Own	4-4⅜x6	G,K,D	2-3
Avery.....	12-25	....	4	Own	2-6½x7	G,K,D	3-4
Avery.....	14-28	....	4	Own	4-4⅞x7	G,K,D	3-4
Avery.....	18-36	....	4	Own	4-5½x6	G,K,D	4-5
Avery.....	25-50	....	4	Own	4-6½x7	G,H,D	5-6
Avery.....	45-65	....	4	Own	4-7¾x8	G,K,D	8-10
Bates.....	15-25	....	4	Own	4-4¼x6	Ker.	3
Bates Mule. F	18-25	....	*2	Midw	4-4½x5¼	Gas.	3
Bates Mule H	15-25	....	4	Midw	4-4½x5¼	Gas.	3
Bates Mule G	25-35	....	*2	Midw	4 4½x6	Gas.	com.
Bean.....	8-16	....	*1	Own	4-3⅞x4	G,K	2-3
Beeman.....G	2-4	315	4	Own	1-3½x4½	Gas.	½
Best.....	30	....	*2	Own	4-4¾x6½	G,K,D	4
Best.....	60	....	*2	Own	4-6½x8½	G,K,D	8-9
Boring...1921	....	1850	3	Wauk	4-4¾x5¾	GorK	2
Burn-Oil.1921	15-30	1650	4	Own	2-6¾x7	Ker.	3-4
Capital.....	15-30	1000	2	Own	4-4¾x6	Gas.	3
Case.....	10-18	1090	4	Own	4-3⅞x5	GorK.	2
Case.....	15-27	1680	4	Own	4-4½x6	GorK	3
Case.....	22-40	3100	4	Own	4-5½x6¾	GorK	4-5
Caterpillar T11	25	....	*2	Own	4-4¾x6	Gas.	4
Caterpillar T16	40	....	*2	Own	4-6½x7	Gas.	6
Centaur.....	5-2½	455	2	N Way	2-4½x4½	G or K	1-9
Chase.....	12-25	2100	3	Buda	4-4¼x5½	GorK	2-3
Chicago....40	40	2500	4	Own	4-4½x6	Gas.	4
Cletrac.....W	12-20	1495	*2	Own	4-4 x5½	G,K,D	2-3
Dakota.....4	15-27	1750	3	Dom.	4-4¾x6	Gas.	3
Dart.....B.J.	15-30	2100	4	Buda	4-4½x6	Gas.	3-4
Depue.....A	20-30	2500	4	Buda	4-4½x6	Gas.	4
Dill.....D	20	2480	4	Cont.	4-4½x5½	Gas.	3
Dill.....R.W.	20-	2980	4	Midw.	4-4½x6	Gas	3
Do-It-All.....	4-6	595	..	Own	1-4½x5	Gas.	..
Eagle.....F	12-22	1300	4	Own	2-7 x8	GorK	3-4
Eagle.....F	16-30	1850	4	Own	2-8 x8	GorK	4-5
E-B.....AA	12-20	1545	4	Own	4-4¾x5	GorK	3
E-B.....Q	12-20	1000	4	Own	4-4¾x5	GorK	3
E-B.....	16-32	2000	4	Own	4-5½x7	GorK	4
Evans.....	18-30	2000	4	Buda	4-4½x6	G,K	3
Fageol.....D	9-12	1525	4	Lyc.	4-3½x5	Gas.	2
Farm Horse. B	18-30	1885	4	Clim.	4-5 x6½	G,K	3-4
Farquhar.....	15-25	....	4	Buda	4-4½x6	G,K,D	3-4
Farquhar.....	18-35	....	4	Own	4-6 x8	G,K,D	4-5
Farquhar.....	25-50	....	4	Own	4-7 x8	G,K,D	6-7
Fitch.....4	20-35	....	4	Clim.	4-5 x6½	GorK	3-4
Flour City....	20-35	....	4	Own	4-5½x6	Ker.	4-6
Flour City....	30-50	....	4	Own	4-6¾x7	Ker.	6-8
Flour City....	40-70	....	4	Own	4-7½x9	Ker.	8-1
Fordson.....	.. 20	625	4	Own	4-4x5	G,K	2
Fox.....E	20-40	3100	4	Own	4-5½x7½	G or K	4
Franklin....G	18-30	4000	*2	Clim.	4-5 x6½	G or K	3-3
Franklin.....C	18-30	3350	*2	Clim.	4-5x6½	G or K	3-4
Franklin..G 2	18-30	4350	2	Clim.	4-5 x6½	G or K	3-4
Frick.....A	12-20	....	4	Erd.	4-4 x6	G,K	2-3
Frick.....C	15-28	....	4	Beav.	4-4¾x6	G,K	3-4
G-O.....G	14-28	1485	4	Wauk.	4-4½x5¾	GorK	3
Grain Belt.. A	18-36	2150	4	Wauk.	4-4¾x6¾	GorK	4
Gray.....1920	18-36	$2000	3	Wauk	4-4¾x6¾	Gas.	4
Ground Hog..	19-31	2000	4	Erd.	4-4 x6	GorK	3
Gt. Western St	20-30	1950	4	Beav.	4-4¾x6	K.	4
Hart-Parr...20	20	995	4	Own	2-5¼x6½	K.D	3
Hart-Parr...30	30	1595	4	Own	2-6½x7	K.D	3
Heider.....D	9-16	1170	4	Wauk	4-4¼x5¾	G,K	2
Heider.....C	12-20	1395	4	Wauk	4-4½x6¾	G,K	3
Heider...Cult	6-10	1050	4	LeR.	4-3½x4½	Gas.	1
Hicks.....	20-30	....	4	....	4-4½x6	KorG	4
Huber Light 4	12-25	1185	4	Wauk	4-4½x5¾	GorK	3
Huber Super 4	15-30	1885	4	Midw.	4-4½x6	Gas.	3
Illinois, Super-Drive.....C	18-36	2500	4	Clim.	4 4-5 x6½	G,K	4
Imperial....E	40-70	5000	4	Own	4-7½x9	G,K,D	10
Indiana.....F	5-10	....	2	LeR.	4-3⅛x4½	Gas.	1-2
International..	8-16	1000	4	Own	4-4¼x5	G,K,D	2
International..	15-30	1950	4	Own	4-5¼x8	G,K,D	4
J-T.....N	20-40	3485	*2	Chief.	4-4¾x6	G,K,D	3-4
Klumb.....F	16-32	1650	4	Clim.	4-5 x6½	....	..
LaCrosse...M	6-12	900	4	Own	2-4 x6	G,K	1
LaCrosse...G	12-24	1250	4	Own	2-6 x7	GorK	3
Lauson.....	12-25	1495	4	Midw.	4-4⅛x5¼	Gas.	3
Lauson.....	15-25	1685	4	Beav.	4-4½x6	GorK	3-4
Lauson.....21	15-30	1985	4	Beav.	4-4¾x6	GorK	3-4
Leader.....B	12-18	1095	4	Own	2-6 x6¼	G,K,D	2-3
Leader.....N	16-32	1985	4	Clim.	4-5 x6½	G,K	3-4
Leader....GU	18-35	2775	*2	Clim.	4-5x6½	G,K	3-4
Leonard....E	20-30	2530	4	Buda	4-4½x6	G,K	3
Liberty.....A	18-32	2475	4	Clim.	4-5 x6½	G,K	4
Linn.....W	60	5600	*	Wauk.	4-5 x6¼	Gas.	6
Little Giant..B	16-22	2200	4	Own	4-4½x5	K.	4
Little Giant..A	26-35	3300	4	Own	4-5½x6	K.	6
Lombard.....	85-150	....	*2	....	6-5½x6¾	Gas.	16
Lombard.....	50	....	*2	....	4-4¾x6½	....	6-10
Magnet.....B	14-28	1875	4	Wauk	4-4½x6¼	K&G	3
Master Jr.....	5-10	585	..	LeR.	-2⅜x4	Gas.	1
Merry Gar1921	2	230	2	Evin	1-2⅝x2½	Gas.	..
Minne..All-P	12-25	1200	4	Own	4-4½x7	GorK	3
Minne. Gen.P.	17-30	1850	4	Own	4-4¾x7	GorK	3-4
Minne. Med.Duty	22-44	3300	4	Own	4-6x7	GorK	5-6
Minne. HeavyDuty	35-70	4600	4	Own	4-7½x9	GorK	8-9
Mohawk..1921	8-16	785	4	Light	4-3¼x4½	KorG	1-2
Moline Univ D	9-18	1075	2	Own	4-3½x5	Gas.	2-
Moline Orch..	9-18	1075	2	Own	4-3½x5	Gas.	2-3
Motor Macult	1½	195	2	Own	1-2¾x3½	Gas.	..
Motox.....	15-30	2250	4	Buda	4-4½x6	Gas.	3-4
NB.....1	3-6	425	4	Own	2-3¼x4	Gas.	¾
NB.....2	3-6	425	4	Own	2-2¾x4	Gas.	¾
Nichols-Shep. 20-42	20-42	3100	4	Own	8 x10	GorK	3-6
Nichols Shep. 25-50	25-50	3460	4	Own	9 x12	GorK	4-7
Nilson Jr...E	15-25	1775	4	Wauk	4-4¼x5¾	G or K	3
Nilson Senior.	20-40	2475	5	Wauk	4-5 x6¼	G,K	4
Oil Pull....K	12-20	1485	4	Own	2-6 x8	K,D	3
Oil Pull....H	16-30	2285	4	Own	2-7 x8½	K,D	4
Oil Pull....G	20-40	3175	4	Own	2-8 x10	K,D	5-6
Oil Pull....E	30-60	4590	4	Own	2-10x12	K,D	8-10
Oldsmar GarK	2½-5	395	4	Own	1-5⅜x5½	Gas.	2½
Oliver.....A	15-30	....	*2	Beav.	4-4½x6	GorK	3-4
Once Over Tiller Mark..6	12-25	3000	4	Strns	4-4½x6	Gas.	2
Parrett.....K	15-30	1970	4	Pitt	4-4½x6	G,K	3
Peoria.....L	12-25	1785	4	Clim.	4-5 x6½	G,K	3
Pioneer.....G	18-36	....	4	Own	4-5½x6	G,K,D	4
Pioneer.....C	30-60	....	4	Own	4-7 x8	Gas.	10
Planet Jr.....	5-10	950	2	LeRoi	4-3⅛x1½	Gas	1
Plowman....A	15-30	1995	4	Buda	4-4½x6	G,K	3-4
Port Huron..A	12-25	1700	4	Chief	4-4¾x6	G,K	3
Post.....D	12-20	$1800	4	Wauk	4-4¼x5¾	GorK	2
Prairie Dog..L	9-18	650	3	Wauk	4-3¾x5¼	Gas.	2
Prairie Dog..D	15-30	1250	4	Wauk	4-4½x6¼	Gas.	3
Ranger Cul. T-20	8-16	....	4	LeR.	4-3⅛x4½	Gas.	1
Reed.....	15-30	2250	4	Dom	4-4¾x6	K.	3-4
Reed.....A-1	18-36	2400	4	Dom	4-5 x6	Gas.	4
Reliable.....	10-20	985	4	Own	2-6 x7	Ker.	2
Rex.....	12-25	1600	4	Wauk	4-4¼x5¾	GorK	3
Russell.....	12-24	1500	4	Own	4-4½x5¾	GorK	2-3
Russell.....	15-30	2200	4	Own	4-5 x6½	GorK	3-4
Russell.....	20-35	3000	4	Own	4-5½x7	GorK	4-5
Russell.....	30-60	5000	4	Own	4-8 x10	GorK	8-10
Samson....M	.....	995	4	Nov.	4-4 x5½	G,K	2
Sandusky...J	10-20	1250	4	Own	4-4¼x5½	G,K,D	2
Sandusky...E	15-35	1750	4	Own	4-5 x6½	G,K,D	4
Shawnee Com.	6-12	....	2	LeR.	4-3½x4½	Gas.	10
Shawnee Com.	9-18	....	2	Gray	4-3½x5	....	..
Shelby.....C	10-20	....	4	Erd.	4-4 x6	GorK	2-3
Shelby.....D	15-30	....	4	Beav.	4-4¾x6	G,K	3
Short Turn....	20-40	1500	3	Beav.	4-4¾x6	G,K	3
Square T...A	18-35	2075	3	Clim.	4-5 x6½	K,G	3
Steady Pull..	12-24	1485	4	....	4-4 x5	Gas.	3
Stinson....4E	18-36	1835	4	Beav.	4-4¾x6	G,K	4
Stone.....	20-40	....	4	Beav.	4-4¾x6	G,K	4
Tioga.....3	15-27	2625	4	Wisc.	4-4½x6	Gas.	3-4
Titan.....	10-20	1000	4	Own	2-6½x8	G,K,D	3
Topp.....B	30-45	3500	4	Wauk	4-4¾x6¾	Gas.	3-4
Toro Cultivator	6-10	....	3	LeR.	4-3⅛x4½	Gas.	2
Townsend.....	10 20	1200	2	Own	4-6½x7	Ker	2-3
Townsend.....	15-30	1800	2	Own	4-7 x8	Ker	3-4
Townsend.....	25-50	3000	2	Own	4-8½x10	Ker	4-8
Traction Motor	40-50	....	4	....	8-3¼x5	Gas.	4-5
Traylor....TB	6-12	715	4	LeR.	4-3⅛x4½	Gas.	1
Triumph....H	18-36	2450	2	Erd.	4-4¾x6	Ker.	4
Trundaar...10	25-40	3750	*2	Wauk	4-5 x6¼	G or K	4
Turner...1921	14-25	1295	4	Buda	4-4¼x5½	G,K	3
Twin City.....	12-20	....	4	Own	4-4¼x6	G,K	3
Twin City.....	20-35	....	4	Own	4-5½x6¾	G,K	5
Twin City.....	40-65	....	4	Own	4-7¾x9	G,K	8
Uncle Sam C20	12-20	1385	4	Weid.	4-4 x5½	G	2-3
Uncle Sam B19	20-30	2300	4	Beav.	4-4¾x6	G or K	3-4
Uncle Sam D21	20-30	1985	4	Beav.	4-4¾x6	G or K	3-4
Universal.....	1-4	475	2	Own	1-3½x5	G	1
Utilitor....501	2¼-4	380	4	Own	1-3½x4½	G	5-6
Velie..Biltwell	12-24	1750	4	Own	4-4½x5½	G,K,D	3
Victory...1921	9-18	1350	4	Gray.	4-3½x5	Gas.	2
Victory...1921	15-30	1750	4	Wauk	4-4¼x5¾	Gas.	3
Vim.....B	15-30	1650	4	Wauk	4-4½x5¾	G,K	3
Wallis.....K	15-25	1600	4	Own	4-4¼x5¾	G,K	3
Waterloo...N	12-25	....	4	Own	2-6½x7	G,K	3
Webfoot....40	25-40	4000	..	....	....	....	..
Webfoot....53	28-53	5250	*2	Wisc.	4-5¾x7	G,D	6
Wellington..B	12-22	900	4	Erd.	4-4 x6	Ker.	2-3
Wellington..F	16-30	1400	4	Chief	4-4¾x6	Ker.	3-4
Western. 1920	16-32	2100	4	Clim.	4-5x6½	Gas.	4
Wetmore.....	12-25	1650	4	Wauk	4-4 x5¾	G,K	3
Wharton....E	12-20	1800	3	Buda	4-4¼x5½	Gas.	2
Whitney.....	9-18	1175	4	Own	2-5½x6½	Gas.	2
Wichita.....T	15-30	2500	4	Beav.	4-4½x6	G,K,D	3-4
Wisconsin...E	16-30	2250	4	Clim.	4-5 x6½	Ker.	4
Wisconsin...H	22-40	3200	4	Clim.	4-5½x7	Ker.	5
Yuba....15-25	15-25	2945	*2	Wisc.	4-4¼x6	G,K,D	..
Yuba....25-40	25-40	4892	*2	Wisc	4-5¾x7	G,K,D	..
Zelle.....	12-25	....	4	....	4-4¼x5½	G or K	3

ABBREVIATIONS: G—Gasoline, K—Kerosene, D—Distillate. Plow capacity varies in relation to operating conditions. Figures are based on 14 in. plows. Engine Make; Beav.—Beaver, Clim.—Climax, Cont.—Continental, Dom.—Domas, Evin.—Evinrude, Herc.—Hercules, LeR.—LeRoi, Midw.—Midwest, Nway.—New Way, Nor.—Northway, Strns.—Stearns, T.C.—Twin City, Wauk.—Waukesha, Weid.—Weidely, Wis.—Wisconsin, *—Crawler type. All others are wheel type.

COMING MOTOR EVENTS

AUTOMOBILE SHOWS

Reno, Nev.	Automobile Show	July 4-9
Indianapolis	Automobile and Accessory Show	Sept. 6-10
Cincinnati	Fall Automobile Show	Oct. 1-8
Olympia, Eng.	Automobile Show	Nov. 3-12
Chicago	Automotive Equipment Show	Nov. 14—19
New York	Automobile Salon	Nov. 27-Dec. 3
Chicago	Automobile Salon	January—1922

RACES

Tacoma	Speedway Race	July 24
Le Mans	French Grand Prix	July 25
Elgin	Road Race (Possible)	August 3
Cotati, Calif.	Opening of New Speedway	August 14
Pikes Peak	Hill Climb	September 5
Uniontown Speedway	Annual Autumn Classic	September 5
Los Angeles	Speedway Race	November 24

FOREIGN SHOWS

Buenos Aires, Argentina	Passenger Cars and Equipment	September
Luxemburg	Luxemburg Agricultural Sample Exhibition	September
Paris, France	Paris Motor Show	October 5-16
London	British Motor Show, Society Motor Mfrs. and Traders	Nov. 4-12

CONVENTIONS

Mackinac Island, Mich.	Summer Meeting Automotive Equipment Association	July 4-9
Greenville, S. C.	South Carolina Automotive Trade Association	July 20
Coden, Ala.	Midsummer Meeting of Alabama Automobile Dealers' Ass'n	July 25-26
Chicago	Twenty-eighth Annual Convention National Implement & Vehicle Association	Oct. 12-24
Cleveland	National Tire Dealers' Association	November

Business Notes

Nash-Cincinnati Motors Co.'s new building located on Reading at Morgan street, was formally dedicated last week by G. W. Nash, president of the Nash Motors Co. C. B. Voorhis, vice-president and general sales manager of the company, W. H. Alford, vice-president, and E. C. Howard, vice-president and sales manager of the LaFayette Motors Co., also participated in the dedication.

The Stephens Corp., 1218 Michigan avenue has been appointed agents for the King car in Chicago territory. This company is also distributor for Scripps-Booth.

Manufacturing and patent rights of the Safety Oiling System have recently been purchased from Charles Kralicek & Co., of Cleveland, by Safety Oiling System, Inc., who now occupy their new building at 2203 Fairmont ave., Philadelphia. This company has recently been reorganized and incorporated, with W. H. Simon, formerly universal distributor for the Safety Oiling System, as president.

Worcester Electric Tool Corp. has taken over the business formerly conducted by the Stenman Electric Valve Grinder Co., Inc., the Stenman Electric Tool Co. and the Consolidated Machine Tool Co., all of Worcester. The Worcester Electric Tool Corp., which was organized to take over the three concerns, is headed by H. P. Gleason, A. G. Sandberg is treasurer, J. J. Kelleher is sales manager, and Harold Paine, advertising and service manager. The principal products which will be featured for the present are the HusKee service tools and drills.

American Forging & Socket Co., of Pontiac, Mich., report that after several months of idleness, in which its plant was almost wholly inoperative, that it is now on a basis about 60 per cent of normal, and is experiencing a steadily increasing demand for its products.

Perfex Radiator Co. has appointed the Hirsig Sales Co., 908 Broadway, Nashville, Tenn., factory representative for the states of Virginia, West Virginia, North Carolina, South Carolina, Kentucky, Tennessee, Georgia, Alabama, Louisiana, Florida, and Texas.

Timme Spring Corp., of Chicago, already a very large organization in its special line, has opened its expansion campaign, and will double its capacity, according to advices from the factory headquarters.

Durant Promises New Car Production for About Aug. 1

New York, July 5—Production of the new Durant car will be started at the Long Island City plant about Aug. 1. It is understood that approximately 20,000 orders for the car already have been received from eastern territory. This will keep the plant running at full capacity for a year. Experimental work on the four cylinder car, which will sell for $890, has been completed and it is practically ready for inspection.

One of the main advantages of the car, its makers contend, is the low maintenance cost which will result from the remarkable accessability of its various parts. The car, which will weigh 2300 pounds fully equipped, will be rated at 24 horsepower and will develop a speed of 50 miles an hour on a level road.

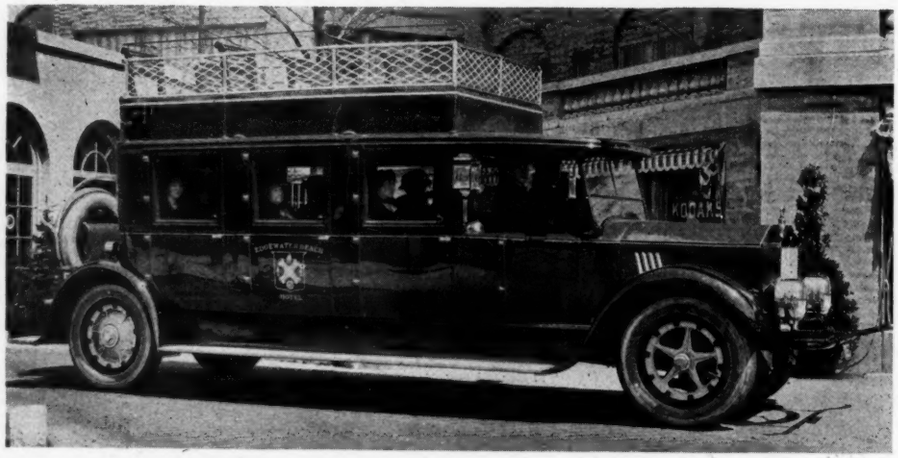
FINANCE ASSOCIATION ELECTS

Indianapolis, July 2—F. E. Barrett was named chairman of the Indiana Finance association, in a conference of automobile sales finance corporation representatives here recently. Other officers elected were Cuppy Stratton, Linton, Ind., vice chairman; Geo. A. Kuhn, Indianapolis, secretary; John W. Twitty, Indianapolis, treasurer. J. B. Perlee, Chicago, secretary of the National Finance association, described the national organization and its function. Uniformity in buying and selling of automobile paper in Indiana will be one of the first important efforts of the Indiana association which includes representatives of 75 finance corporations.

RACES FOR COTTON EXPOSITION

Waco, Tex., July 5—Automobile races for the Cotton Palace Exposition here have been assured. The exhibition will be held early in the fall. It was announced this week that contracts with several of the racers which were recently at the Indianapolis meet are signed and that efforts will be made to establish new records for dirt tracks. Thousands of dollars will be given in purses. Many of the drivers who come to Texas for the big meet of the State Fair of Texas at Dallas have also signed for the races here.

Claiming the Title, "Most Luxurious Bus"



Two buses believed to be the most expensive and luxurious in service in the United States have just been put into operation in Chicago by the management of the Edgewater Beach Hotel. They are used to transport passengers between the hotel and downtown shopping districts. With White motor bus construction as the basis, the buses are of special design throughout. Illumination for reading at night is one of the features. Passengers who prefer to ride on the top deck, to smoke or be in the open, ascend to their seats by means of a winding flight of steps